10th US SYMPOSIUM ON HARMFUL ALGAE

Orange Beach, Alabama
November 3-8, 2019

Conference Program

Front Cover: The Mobile-Tensaw delta in Alabama is the interface between freshwater and marine waters, resulting in many mixed blooms throughout the year. Photo Credit: Ben Brenner

Free Wi-Fi internet connection is available in all conference spaces. Please check the registration desk for the code/s.

Social Media Policy (Please Read)

Best practice guideline for using social media during the conference.

- **NO Photography, video and or audio recording of scientific content from any session during the week (unless you receive permission from the authors/presenters) to respect presenters that wish to withhold audio-visual material from being recorded and or posted on social media. This includes photos of posters.**
- Conference attendees may openly discuss general conference activities on social media. Please use the meeting hashtag #USHAB2019
- We encourage the use of photos and video, but please restrict it to non-scientific content such as social events, in the Vendor Hall, and in public spaces throughout the meeting

Program Authors: Alison Robertson, Rebecca Domangue, Elizabeth Murphy, Molly Miller. Additional written contributions from Holly Bowers, Tim Davis, Chris Scholin, Alan Wilson and Matt Waters

Logo Design: Katherine Hooker, University of Oklahoma

Program Design: Ben Brenner for COBIA DIGITAL

Please note: Information contained in this program is accurate as of the date of printing (Oct 23, 2019).

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WELCOME MESSAGE
From the Local Organizing Committee

Dear Colleagues and Guests,

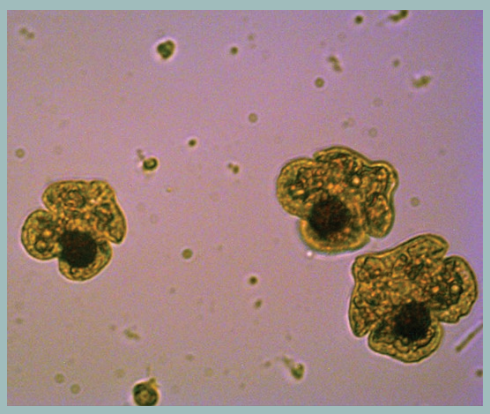
On behalf of the local organizing committee and the host institutions (University of South Alabama, The Dauphin Island Sea Lab, Auburn University, and the University of Oklahoma), it is our pleasure to welcome you to Orange Beach, Alabama for the ***10th US Symposium on Harmful Algae.*** This year marks almost two decades of this community coming together to formally share and discuss research and issues on harmful algae, and we are pleased that so many are planning to join us along the northern Gulf of Mexico for what will be the largest US HAB symposium to date. While the impacts of harmful algae are now well recognized across the US and the world, these issues have expanded to many new regions and coastlines and HABs remain an important issue to local communities who rely on freshwater and marine resources.

The theme of this ***10th US Symposium on Harmful Algae*** is "Connecting the Headwaters to the Coast" which signifies the continued importance and linkage of ecosystems across watersheds in HAB research. Our theme also highlights the need to diversify across sectors and enhance connectivity of the HAB community. This year, the northern Gulf of Mexico coast has seen a merge of freshwater and marine HABs at the land sea interface as never before, presenting new issues to coastal communities. This brings a strong need for marine and freshwater researchers to come together to better understand the drivers, physiology, toxicity, and impacts of these mixed blooms in dynamic environments. It is our hope that through the interdisciplinary sessions and events we can further engage and inspire each other towards predictive models, mitigation strategies, and improved management practices.

The local organizing committee, advisory committee, scientific committee, session chairs, and our many local student and institutional volunteers will make every effort to ensure that your participation is both productive and enjoyable.

Alison Robertson, Alan Wilson, Molly Miller, Matthew Waters, Dave Hambright, and Rebecca Domangue.

WELCOME MESSAGE
From the National HAB Committee



Microscopy Images:
A. Robertson & L. Novoveska

Dear Colleagues,

On behalf of the National HAB Committee (NHC), we would like to welcome everyone to Orange Beach, Alabama for the 10th US Symposium on Harmful Algae! The meeting organizers have been working tirelessly to provide a schedule that is both broad in scope and forward thinking. To further ensure a successful meeting, it also takes a lot of work on the part of each participant – data crunching, assembling presentations, making travel arrangements, and supporting student attendance. Now, it is time to showcase your work since last we convened, develop new collaborations, and enjoy interacting with friends and colleagues you might otherwise not meet beyond video conferencing and e-mail.

Since the inception of this meeting the field of harmful algal bloom research has changed dramatically. There has been an increasing awareness of this problem by state and federal leadership as well as the general public. This is highlighted by the increasing participation and diversity at this meeting. This year we have over 350 registrants making this meeting the largest to date. These registrants span the freshwater-marine continuum and consist of water managers, academic faculty, state and federal scientists, science communication specialists and, most importantly, students who represent the next generation of scientists who will continue to carry the torch and drive our field forward.

We hope that you are able to take advantage of this diversity and throughout the week interact with colleagues from these various backgrounds and develop new collaborations and friendships.

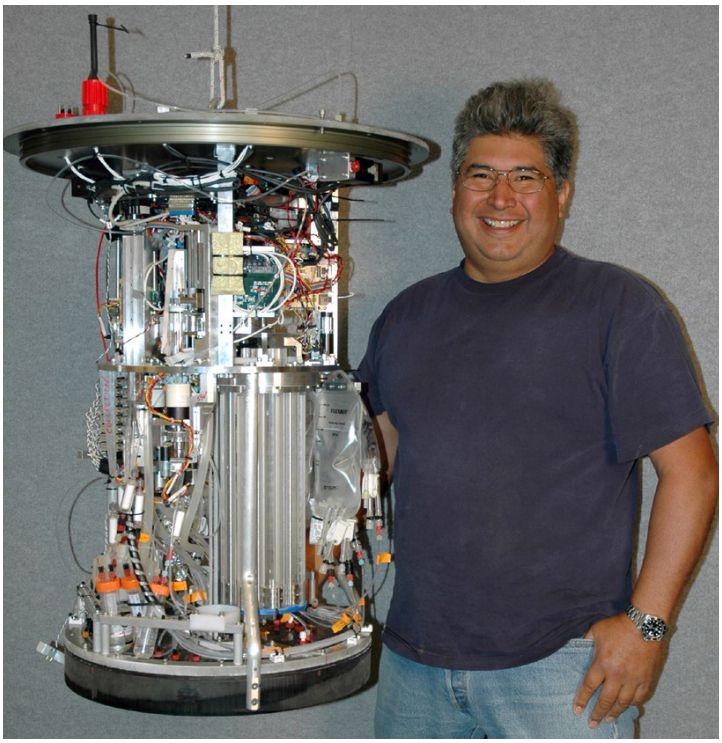
With each HAB meeting, the organizing committee strives to add an additional aspect to expand and nurture our field. To that end, this year in response to the growing number of large HAB events nationwide you will notice an increase in efforts to address Science Communication, highlighted by a newly added workshop. This inaugural workshop is meant to spark interest and offer tools from some of our media-seasoned colleagues, so we are ready to respond and serve as communication resources in times of impactful HAB events. Blooms know no boundaries or political climates. Increasingly, we as individual HAB scientists are being asked to comment publicly in the era of near-instantaneous news cycles, and it has become imperative that we continue to engage with local and regional contacts and to perhaps step outside our comfort zones in doing so. We can embrace this digital age and utilize it to reach broad audiences, stimulate public interest, bridge knowledge gaps, and motivate action. The topic of Science Communication further threads through the more traditional meeting topics we are accustomed to, including bloom dynamics and their drivers, mitigation and control, monitoring and management, and engaging citizens and stakeholders.

We wish everyone an enjoyable and productive meeting, full of exciting ideas and camaraderie to last until we meet again!

Holly Bowers
NHC Co-chair

Timothy Davis
NHC Co-chair

IN MEMORIAM: ROMAN MARIN III



Roman Marin III with the original "second generation" Environmental Sample Processor. Photo credit: Todd Walsh © 2006 MBARI

The ocean science community lost one of its luminaries on September 17th, 2019, when Roman Marin III unexpectedly passed away just shy of his 65th birthday.

Roman was well known to many in the HAB research and management community, and someone who frequented national and international HAB meetings. Yet, he was not one who was celebrated for his list of first-authored publications, keynote addresses, or advocacy triumphs; Roman was someone who enabled others to shine in those arenas, and he reveled in the opportunity to do just that. Those who knew him will sorely miss his hardworking, can-do attitude, his abilities in both science and hands-on engineering, and perhaps most of all his quirky sense of humor.

Roman came to a career in ocean science from a very unconventional route. An expert car mechanic, well into his adult years and with two young children, Roman decided to return to school in the mid-1990s to pursue a master's degree at the University of California, Santa Cruz. There he met Professor Mary Silver, which led him to the Monterey Bay Aquarium Research Institute (MBARI). Roman became interested in rapid methods for detecting HAB species using DNA probe technology. Translating that methodology from a lab-based, manual sample handling procedure to one that could be fully automated by a robotic device was a challenge that Roman was particularly well suited to tackle. After completing his graduate studies, he joined MBARI as a full-time research technician and contributed to developing several versions of what eventually became known as the Environmental Sample Processor (ESP). A look back at twenty-five years after he committed to that career showcases his many contributions towards making the ESP vision a reality. Roman was a key member of the team who devised a way to print DNA probe arrays on permeable filters for use aboard the ESP, formulated

the reagents that made their application in situ possible, trained people how to use the instrument, and often participated in storied ESP field deployments.[1]

Over the years Roman's talents were applied widely. The HAB work increasingly gave way to applying ESP technology to more general microbial and environmental DNA (eDNA; DNA shed from macroscopic animals) investigations. That experience extended Roman's connections with people from all over the world, from many walks of life, with interests ranging from deep-sea hydrothermal vents to wilderness areas in Montana and Wyoming. At the time of his passing, Roman was preparing to meet the RV Sally Ride to install an ESP aboard that ship to collect samples along a route from Guam to San Francisco.

There was not a challenge or an opportunity that Roman would pass up, and one of his greatest joys was seeing the fruits of his labor help others. When asked about his scientific journey last year aboard the RV Falkor[2], Roman reflected, "One of the biggest hurdles we had to overcome was to have the [ocean science] community actually believe we could do what we said we could do."

Roman Marin III using a hand-portable version of the 3rd Gen Environmental Sample Processor to collect water from the Gardner River in Montana, 2017, in a quest to find the elusive "brain-eating amoeba", Naegleria fowleri, and invasive species' eDNA.[3] Photo credit: K. Yamahara

As the HAB community gathers to exchange ideas and discuss the latest results of national and international research programs, let us remember and honor the contributions of people like Roman who are at the cutting edge of moving ocean science forward.

Chris Scholin
(October 9, 2019)

References

1. Scholin, C., Birch,J., Jensen, S., Marin III, R., Massion, E., Pargett, D., Preston, C., Roman, B., Ussler III, W. 2017. The quest to develop ecogenomic sensors: A 25-year history of the Environmental Sample Processor (ESP) as a case study. Oceanography 30:100-113.
2. https://schmidtocean.org/cruise-log-post/microbeeddybots_wrap_up/
3. https://annualreport.mbari.org/2017/story/brain-eating-amoebae-deep-sea-research-leads-to-new-tools-for-detecting-pathogens-in-yellowstone

COMMITTEES

LOCAL ORGANIZING AND SCIENTIFIC COMMITTEE

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Meredith HOWARD
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Mindy RICHLEN
Alison ROBERTSON
Marc SUDDLESON
Matthew WATERS
Alan WILSON

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Avery LAMB, Auburn University
Alexander LEYNSE, University of South Alabama
Israel MARQUEZ, University of South Alabama

TIMEKEEPERS AND SPECIAL ASSISTANCE

Sean COLLINS, University of South Alabama
Sophie MAASS, University of South Alabama
Elizabeth MURPHY, University of South Alabama
Corinne SWEENEY, University of South Alabama

SESSION CHAIRS (in order of appearance)

Michael BROSNAHAN
Kimberly REECE
Dianne GREENFIELD
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John RAMSDELL
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Michael PARSONS
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Kathi LEFEBVRE

SPONSOR ACKNOWLEDGMENTS

The organizing committee wishes to warmly thank the following institutions and companies for their support and contributions:

Institutional Support

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Dauphin Island Sea Lab
Alabama

USA
UNIVERSITY OF SOUTH ALABAMA

AUBURN UNIVERSITY
SCHOOL OF FISHERIES, AQUACULTURE AND AQUATIC SCIENCES

Sea Grant
MS-AL, MD, WA, LA, FL, DE, TX, CT, NC, OH

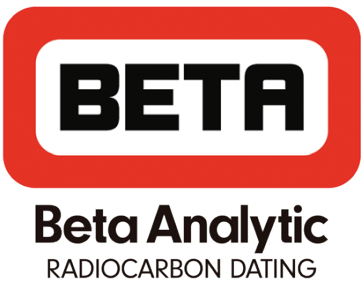
The UNIVERSITY of OKLAHOMA
Office of the Vice President for Research
Office of the Senior Vice President and Provost
College of Arts and Sciences

Student Sponsors

MD, WA, LA, FL, DE, TX, CT, NC, & OH Sea Grants

In addition, the following sponsors agreed to provide student support:
Turner, Phytoxigene, McLane

Vendors and Sponsors



SYMPOSIUM EVENT CODE OF CONDUCT

A core goal of the USHAB meeting is to foster a scientific community that is safe, hospitable, and productive for all its members. Thus, the organizing committee seeks to provide a welcoming and productive environment for those attending our meetings, workshops, and events, regardless of gender, sexual orientation, gender identity, race, ethnicity, religion, disability, physical appearance, or career level. All participants, including, but not limited to, attendees, speakers, volunteers, exhibitors, USHAB and venue staff, service providers, and others are expected to abide by this Events Code of Conduct. This Code of Conduct applies to all components of the USHAB event, including those sponsored by organizations other than the National HAB committee but held in conjunction with the USHAB symposium, in public or private facilities.

EXPECTED BEHAVIOR

- All participants, attendees, staff, and vendors are treated with respect and consideration, valuing a diversity of views and opinions.
- Be considerate, respectful, and collaborative.
- Communicate openly with respect for others, critiquing ideas rather than individuals.
- Avoid personal attacks directed toward other attendees, participants, staff, and suppliers/vendors.
- Be mindful of your surroundings and of your fellow participants. Alert staff if you notice a dangerous situation, or someone in distress.
- Respect the rules and policies of the meeting venue, hotel or any other venue.

UNACCEPTABLE BEHAVIOR

- Harassment, sexual harassment, bullying, or discrimination, in any form will not be tolerated.
- Physical or verbal abuse of any attendee, speaker, volunteer, exhibitor, US HAB staff member, service provider, or other event guest.

- Examples of unacceptable behavior include, but are not limited to, verbal comments related to gender, sexual orientation, disability, physical appearance, body size, race, religion, national origin, inappropriate use of nudity and/or sexual images in public spaces or in presentations, or threatening or stalking any attendee, speaker, volunteer, exhibitor, US HAB staff member, service provider, or other event guest.
- Disruption of talks at oral or poster sessions, in the exhibit hall, or at other events organized by the US HAB committee at the event venue, hotels, or other US HAB contracted facilities.

CONSEQUENCES

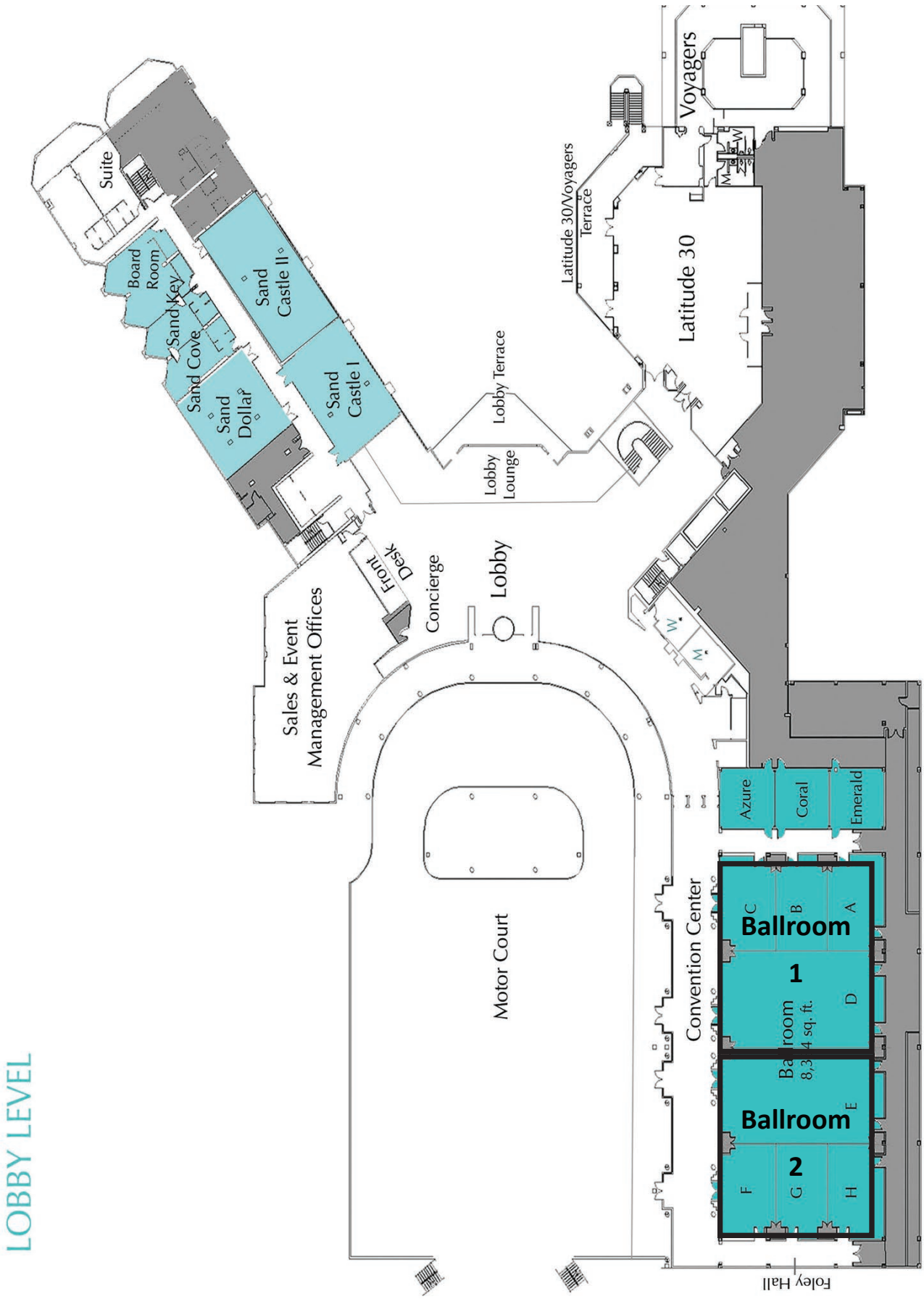
- Anyone requested to stop unacceptable behavior is expected to comply immediately.
- US HAB staff (or their designee) or security may take any action deemed necessary and appropriate, including immediate removal from the meeting without warning or refund.

REPORTING UNACCEPTABLE BEHAVIOR

- If you are the subject of unacceptable behavior or have witnessed any such behavior, please immediately notify one of the local US HAB organizers listed in this program.

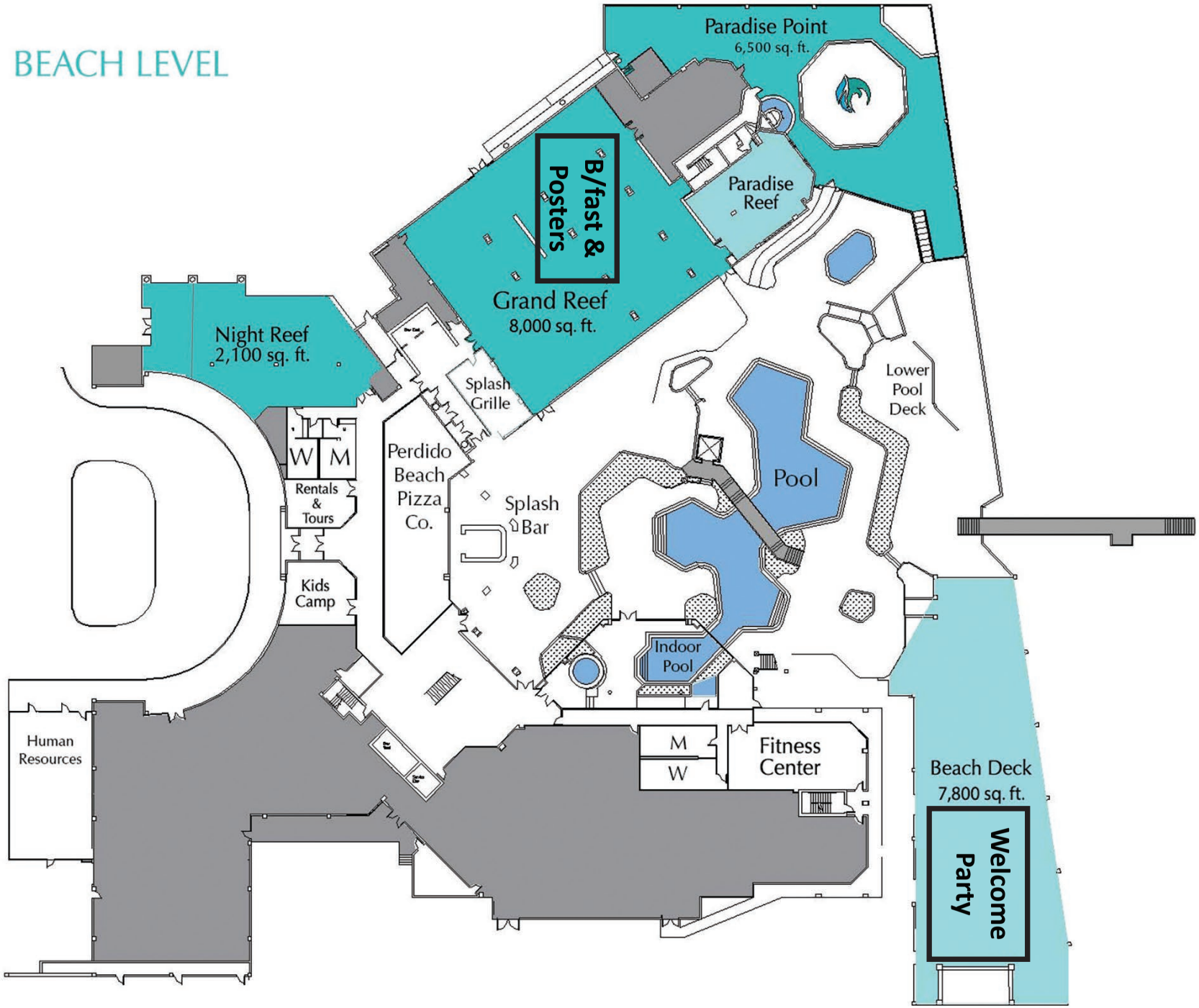
Cyanobacterial bloom in an Alabama aquaculture pond
Photo credit: Alan Wilson

CONFERENCE VENUE FLOOR PLAN



LOBBY LEVEL

BEACH LEVEL


Paradise Point
6,500 sq. ft.
B/fast & Posters
Paradise Reef
Grand Reef
8,000 sq. ft.
Night Reef
2,100 sq. ft.
Splash Grille
Lower Pool Deck
W
M
Rentals & Tours
Perdido Beach Pizza Co.
Splash Bar
Pool
Kids Camp
Indoor Pool
Human Resources
M
W
Fitness Center
Beach Deck
7,800 sq. ft.
Welcome Party

PRE-CONFERENCE WORKSHOPS

CyanoDTec and DinoDTec Assay Workshop

Organizer: Mark Van Asten (mark@phytoxigene.com)

Diagnostic Technology

When: Sunday November 3rd 8:00 AM — 4:00 PM; Coral Room

Description: Demonstration and hands-on qPCR techniques will be presented for the monitoring and detection of cyanobacteria and paralytic shellfish poisoning (PSP) producing dinoflagellates. In the morning session (8:00 AM — 12:00 NOON) the workshop will discuss the design, objectives and scope of the CyanoDTec cyanobacteria multiplex assay, while in the afternoon session (1:00 PM — 4:00 PM) will be focused on the PSP dinoflagellate assay, DinoDTec. In both sessions there will be discussion about the use of qPCR for the monitoring of HABS and how it can be integrated into monitoring with existing methods to enhance prediction and management of HAB events.

Imaging Flow Cytobot Workshop

Organizers: Lisa Campbell (lisacampbell@tamu.edu), D. Henrichs (Texas AM University); Ivory Engstrom and Vinnie Ferreira (McLane Research Labs)

When: Sunday November 3rd 8:30 AM — 4:00 PM; Ballroom 1

Description: Designed for existing users of the IFCB. During the course of the workshop recent updates to IFCB technology will be discussed and participants will be encouraged to engage in further discussion on any issues, solutions, and user needs.

Phytoplankton Identification Workshop

Organizers: Alan Wilson (wilson@auburn.edu), Alison Robertson (arobertson@disl.org), Michael Parsons (mparsons@fgcu.edu), and Barry Rosen (brosen@fgcu.edu) along with industry partners from FlowCam, Horiba, Turner Designs, and bbe Moldaenke.

When: Sunday November 3rd 9:00 AM — 12:00 NOON; Ballroom 1

Description: The basics of phytoplankton identification, focused on marine and freshwater HABs and related tools that can assist in identification and enumeration. Participants are encouraged to bring cultures and preserved specimens.

Communicating HAB Science

Organizers: Mindy Richlen (mrichlen@whoi.edu), Tim Davis (timdavi@bgsu.edu), and Holly Bowers (hbowers@mlml.calstate.edu)

When: Sunday November 3rd 1:00 PM — 3:00 PM; Ballroom 1

Description: This two-hour panel discussion is open to HAB researchers at all levels who are interested in learning more about communicating their research to non-scientific audiences, including the general public, policy makers, and journalists. Panelists will include HAB scientists that are actively engaged in communicating with diverse audiences, and topics will include public communication during bloom events, leveraging social media, translating scientific findings for non-technical audiences, and engaging policy makers and reporters. Please join us for a discussion with your peers of the complexities and challenges of science communication!

K. brevis bloom in the northern Gulf of Mexico
Photo credit: Jaylyn Babitch, Dauphin Island Sea Lab

SPECIAL EVENTS

Thinking Outside the Box:

Career options and strategies for new graduates and early career scientists

Organizers: Molly Miller (mmmiller@disl.org)

When: Sunday November 3rd 4:00 PM — 6:00 PM; Ballroom 1

Description: The goal of the workshop is to provide attendees insight into different career opportunities and highlight how different personal experiences and interests can aid in determining a career path. A large portion of this workshop will be dedicated to a question and answer session with the panelists and attendees. The workshop attendees will include undergraduate students, graduate students, and early career individuals (e.g., post-doctoral fellows). Invited panelists cross a wide spectrum of science careers (i.e., Academia, State and Federal government, Industry, and non-governmental organizations).

Invited Panelists

Industry: **Harry Nelson**
Fluid Imaging

Education & Outreach: **Ms. Angela Underwood**
Weeks Bay NERR

Academia: **Dr. Tim Sherman**
University of South Alabama

Federal: **Dr. Maggie Broadwater**
NOAA National Ocean Service

Early Career Brown Bags

When: Tuesday, Thursday, and Friday 12:30 PM — 1:30 PM; Grand Reef Room

Description: These events are designed to provide students and early career individuals with an opportunity for a more informal yet in-depth discussion of various career paths to be considered following graduate school. The goals are to provide students with an opportunity to connect with various professionals and have an informal discussion on what their specific career entails, how they got there, provide students with tangible advice on career opportunities and the varied avenues available to them. Lunch provided for the first 40 participants.

HABs Stakeholder & Community Meeting

When: Wednesday November 6th from 4:00 PM — 6:00 PM; Grand Ballroom

Description: The University of South Alabama, The Dauphin Island Sea Lab, in partnership with Mississippi-Alabama Sea Grant Consortium, is hosting a stakeholder community meeting.

This session will allow commercial and recreational fishers, shellfish growers and harvesters, tourism professionals, natural resource managers, and others the opportunity to share their concerns about HABs and to hear from scientists on the forefront of current research. Additionally, participants will have the opportunity to help prioritize research projects in our area of the Gulf and provide valuable feedback to session leaders about existing needs for HAB preparation and recovery in our coastal communities. Input and questions gathered during the session will be compiled into a post-session summary document for distribution to session participants, local government officials, and policy makers.

The purpose of this session is to:

- Allow stakeholders to share their concerns about HABs.
- Hear from scientists studying HABs in the Northern Gulf of Mexico.
- Discuss priorities & needs of stakeholders to prepare for and recover from HABs.
- Prioritize research to be conducted in the future.

Oyster social to follow at the Big Beach Brewing Company

6:30 PM — 8:00 PM (free shuttle)

Northern Gulf of Mexico oyster aquaculture is a growing resource
Photo Credit: A. Robertson

HAB Town Hall Meeting

When: Thursday November 7th from 2:00 PM — 3:45 PM; Ballroom 1

Description: The National Harmful Algal Bloom Committee (NHC) and partners will host a town hall event aimed at discussing current events, funding, and issues relevant to the HAB community. These will include a NOAA program update, NHC update, legislative and funding update, international programs update, and community interest update. All attendees are encouraged to attend and ask questions.

Conference Awards & Wrap Up

Conference Highlights, Student Awards, US HAB 11 Announcement

When: Friday November 8th from 2:00 PM — 4:00 PM; Ballroom 1

Description: Please join us on Friday afternoon for the symposium highlights seminar presented by Don Anderson (Woods Hole Oceanographic Institute). This session will highlight the new avenues and innovation in HAB research presented at the conference, and touch on continuing needs and opportunities.

Please also support our students at the student presentation awards ceremony and conference wrap up.

Refreshments will be provided.

Shrimp boat in Mississippi Sound
Photo Credit: Ben Brenner

SUNDAY, NOVEMBER 3, 2019

8:00 AM — *Breakfast on your own*

Workshop
CyanoDTec & DinoDTec
Coral Room
8:00 AM to 4:00 PM

8:30 AM

Workshop
Imaging FlowCytobot
Ballroom 1
8:30 AM to 4:00 PM

9:00 AM

Workshop
Phytoplankton Identification
Ballroom 1
9:00 AM to 12:00 PM

12:00 PM — **Break for Lunch**
12:00 PM to 1:00 PM

12:30 PM

1:00 PM

Workshop
Communicating HAB Science
Free - Ballroom 1
1:00 PM to 3:00 PM

Imaging FlowCytobot Workshop (Cont.)

CyanoDTec & DinoDTec Workshop (Cont.)

2:00 PM

3:00 PM

REGISTRATION OPENS
3:00 PM

4:00 PM

NHC MEETING
4:00 PM to 6:00 PM

4:30 PM

THINKING OUTSIDE THE BOX
Early Career Workshop
Free - Ballroom 1
4:00 PM to 6:00 PM

6:00 PM — **Break**
6:00 PM to 7:00 PM

7:00 PM — **WELCOME PARTY**
Free for All - Beach Deck
7:00 PM to 10:00 PM

10:00 PM

MONDAY, NOVEMBER 4, 2019

	Track A — Ballroom 1	Track B — Ballroom 2
7:00 AM	**Breakfast** — *Grand Reef (Beach Level)* — *Free for All*	
8:00 AM	**Welcome & Opening Remarks**	
8:30 AM	**Session 1:A** Innovation in HAB Detection 8:30 AM to 10:15 AM	**Session 1:B** Blooms Dynamics & Drivers I 8:30 AM to 10:15 AM
10:15 AM	**Session Break** — Refreshments Provided — 10:15 AM - 10:45 AM	
10:45 AM	**Session 2:A** Cell and Molecular Technology Advances 10:45 AM to 12:30 PM	**Session 2:B** Blooms Dynamics & Drivers II 10:45 AM to 12:30 PM
12:30 PM	**Plenary Lunch** by Morgan Steffen *Free for All - Grand Ballroom* 12:30 PM - 2:00 PM	
2:00 PM	**Session 3:A** Method Validation and Reference Materials 2:00 PM to 4:00PM	**Session 3:B** Blooms Dynamics & Drivers III 2:00 PM to 3:45 PM
3:45 PM		**Session Break**
4:00 PM	**Poster Session 1** Refreshments & Drink Ticket *Free for All - Grand Reef (Beach Level)* 4:00 PM - 6:00 PM	
6:00 PM	**Reference Material Priorities for the US HAB community** Pearse McCarron and John Ramsdell *(Open to All Attendees)*	
7:00 PM	**Harmful Algae Trivia Night** Hosted by the Graduate Students – All Welcome *Cash Bar - 7:00 PM -10:00 PM*	
10:00 PM		

TUESDAY, NOVEMBER 5, 2019

	Track A — Ballroom 1	Track B — Ballroom 2
7:00 AM	**Breakfast** — *Grand Reef (Beach Level)* — *Free for All*	
8:00 AM	**Announcements**	
8:30 AM	**Session 4:A** Predictive Models and Forecasting 8:30 AM to 10:15 AM	**Session 4:B** Microbial Interactions 8:30 AM to 10:15 AM
10:15 AM	**Session Break** — Refreshments Provided — 10:15 AM - 10:45 AM	
10:45 AM	**Plenary** by Meredith Howard & Panel Discussion 10:45 AM - 12:30 PM	
12:30 PM	**Lunch** Early Career Brown Bag: Industry Career Paths *Free Lunch for the First 40 Participants – Grand Reef (Beach Level)* 12:30 PM - 1:30 PM	
1:30 PM	**Open Time for Collaborative Meetings** 2:00 PM to 4:00 PM	
4:00 PM	**Poster Session 2** Refreshments & Drink Ticket *Free for All - Grand Reef (Beach Level)* 4:00 PM - 6:00 PM	
6:00 PM	**Break** 6:00 PM - 7:00 PM	
7:00 PM	**SOCIAL SHRIMP BOIL** Dancing and Local Music at the Flora-Bama Yacht Club *Free for All, Free Shuttle from 7:00 PM-10:00 PM*	
10:00 PM		

WEDNESDAY, NOVEMBER 6, 2019

	Track A — Ballroom 1	Track B — Ballroom 2
7:00 AM	**Breakfast** — *Grand Reef (Beach Level)* — *Free for All*	
8:00 AM	**Announcements**	
8:30 AM	**Session 5:A** Ecophysiology I 8:30 AM to 10:15 AM	**Session 5:B** Monitoring & Management I 8:30 AM to 10:15 AM
10:15 AM	**Session Break** — Refreshments Provided — 10:15 AM - 10:45 AM	
10:45 AM	**Session 6:A** Ecophysiology II 10:45 AM to 12:30 PM	**Session 6:B** Monitoring & Management II 10:45 AM to 12:30 PM
12:30 PM	**Plenary Lunch** by Stephanie Moore *Free for All - Grand Ballroom* 12:30 PM - 2:00 PM	
2:00 PM	**Session 7:A** Climate I 2:00 PM to 3:45 PM	**Session 7:B** Mitgation and Control I 2:00 PM to 3:45 PM
3:45 PM	**HABs Stakeholder & Community Meeting** All Hands – Grand Ballroom *Refreshments and Snacks Included* 4:00 PM - 6:00 PM	
4:00 PM		
6:00 PM	**Break**	
6:30 PM	**OYSTER SOCIAL** Enjoy Gulf of Mexico Oysters at the Big Beach Brewing Company *Free for All, Free shuttle from 6:30 PM - 8:00 PM*	
8:00 PM		

THURSDAY, NOVEMBER 7, 2019

	Track A — Ballroom 1	Track B — Ballroom 2
7:00 AM	**Breakfast** *Grand Reef (Beach Level)* *Free for All*	
8:00 AM	**Announcements**	
8:30 AM	**Session 8:A** Climate II 8:30 AM to 10:15 AM	**Session 8:B** Mitgation and Control II 8:30 AM to 10:15 AM
10:15 AM	**Session Break** Refreshments Provided 10:15 AM - 10:45 AM	
10:45 AM	**Session 9:A** Food Web Dynamics & Impacts 10:45 AM to 12:30 PM	**Session 9:B** Engaging Citizens and Stakeholders 10:45 AM to 12:30 PM
12:30 PM	**Lunch** Early Career Brown Bag: Extension and Outreach Opportunities *Free Lunch for the First 40 Participants – Grand Reef (Beach Level)* 12:30 PM - 1:30 PM	
2:00 PM	**HAB Town Hall Meeting** All Hands - *Grand Ballroom* 2:00 PM - 3:45 PM	
3:45 PM	**Session Break** 3:45 PM - 4:00 PM	
4:00 PM	**Poster Session 3** Refreshments & Drink Ticket *Free for All - Grand Reef (Beach Level)* 4:00 PM - 6:00 PM	
6:00 PM	**Break**	
7:00 PM	**BANQUET & DANCE PARTY** TICKETS AVAILABLE $50 Ballroom - 7:00 PM – Late	
LATE		

FRIDAY, NOVEMBER 8, 2019

Ballroom 1

7:00 AM — **Breakfast** *Grand Reef (Beach Level)* *Free for All*

8:00 AM — **Announcements**

8:30 AM — **Session 10**

Special Session: Oceans and Human Health

8:30 AM to 10:15 AM

10:15 AM — **Session Break** Refreshments Provided 10:15 AM - 10:45 AM

10:45 AM — **Session 11**

Animal and Human Health

10:45 AM to 12:30 PM

12:30 PM — **Lunch**

Early Career Brown Bag: State & Federal Career Paths

Free Lunch for the First 40 Participants – Grand Reef (Beach Level)

12:30 PM - 1:30 PM

2:00 PM — **Conference Awards & Wrap Up**

Conference Highlights, Student Awards,
US HAB 11 Announcement

Ballroom with Refreshments Provided

2:00 PM - 4:00 PM

4:00 PM — **END OF CONFERENCE**

...but lots of beach activities remaining!

SOCIAL PROGRAM

Welcome Party

Sunday, November 3rd from 7:00 PM — 10:00 PM; Beach Deck

Please join us for the US HAB Welcome Party! The welcome party features local music, food, and drinks. It's a great chance to mingle with other participants at the conference.

Harmful Algae Trivia Night

Monday, November 4th from 7:00 PM — 10:00 PM; Ballroom 2

This event will be hosted by graduate students with a cash bar.

Social Shrimp Boil

Tuesday, November 5th from 7:00 PM — 10:00 PM; off-site

Enjoy dancing and local music at the Flora-Bama Yacht Club with free shuttle service between the hotel and event.

Oyster Social at the Big Beach Brewing Company

Wednesday, November 6th from 6:30 PM — 8:00 PM; off-site

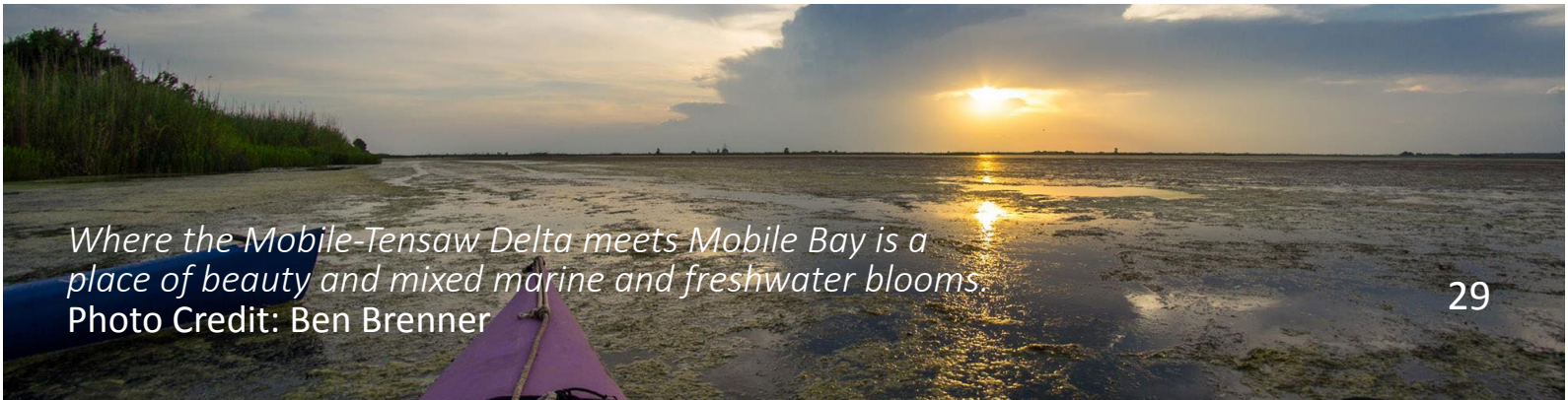
Eat local oysters provided by local harvesters!

Free shuttle service between the hotel and brewery.

Conference Banquet and Dance Party

Thursday, November 7th from 7:00 PM — late; in the Grand Ballroom

The conference banquet and dance party will be held in the Ballroom on Thursday evening. The banquet will be buffet-style and includes drinks. *Tickets must be purchased in advance ($50)



Where the Mobile-Tensaw Delta meets Mobile Bay is a place of beauty and mixed marine and freshwater blooms.
Photo Credit: Ben Brenner

MEALS AND REFRESHMENTS

Breakfast

Breakfast will be provided from 7:00 AM — 8:00 AM on Monday – Friday at the Grand Reef (Beach Level).

Lunch

Lunch will be provided to all participants who attend the Plenary sessions on Monday and Wednesday from 12:30 PM — 1:30 PM in the Grand Ballroom (Lobby Level).

A brown bag lunch will be provided on a first come, first serve basis to any student and/or early career participant that would like to attend any of lunch sessions on Tuesday, Thursday, or Friday from 12:30 PM — 1:30 PM; located in the Grand Reef Room.

Limited to the first 40 people.

Breaks

Light refreshments will be provided daily during the morning break as well as at the POSTER SESSIONS on Monday, Tuesday, and Thursday.

Refreshments will also be provided at the beginning of the Wednesday Stakeholder meeting and the Friday student awards and conference highlights ceremony.

Please bring a reusable cup!

The Alabama Deep Sea Fishing Rodeo is the largest fishing tournament in the United States and a great opportunity to sample.
Photo Credit: A. Robertson.

GUIDELINES FOR CHAIRS AND SPEAKERS

Chairs:

- Each chair will be responsible for
- Introducing the session
- Introduction of session presenters (name, affiliation, talk title)
- Session time management (with assistance from a timekeeper)
- Hosting the presenter Q&A
- Facilitating the session

Please arrive early (at least 30 min in advance) and familiarize yourself with the audio visual (AV) equipment, test the microphone and pointer, and make sure that all presentations are loaded. We suggest that you open and test a sample presentation. Session chairs should contact AV personnel if any problems occur.

Please start the session on time so that parallel sessions are in sync and please keep presenters on schedule.

Please remind people to turn off their cell phones.

One of the rules of presenting is to never leave the podium empty. The session chair should stay at the front of the room until the presenter has arrived and is ready to present. The session chair should walk to the front of the room near the end of the Q&A session, meet the presenter before they leave, start the final applause, introduce the next presenter, and stay at the front until the next presenter is ready.

The session chair leads the Q&A and should always have one question ready for the presenter if the audience does not. The session chair leads applause at three times: applause at the end of each talk, brief applause at end of Q&A, and ask for another round of applause for the speakers at the end of entire session.

A member of the local organizing team staff will help with timekeeping using a cell phone timer and yellow and red cards. Please curtail long-winded talks to maintain overall session timing.

Speakers:
Each presenter will be given 12 minutes to present traditional oral presentations, followed by a 3-minute Q&A period.

For those presenting a Speed Talk, you will have three minutes to present with two minutes for questions.

Please upload your presentation (wide-screen format) ahead of your session. Talks in morning sessions should be uploaded by 7:30 AM. Talks in afternoon sessions must be uploaded by noon.

A computer will be available at the registration desk at all times to allow you to upload your presentation. Further details will be provided at registration desk.

Posters:
All Posters will be on display on easels in the Grand Reef (Beach Level) room all week. Mounting materials and number assignments will be provided at Registration. Set up of posters must be complete before 2:00 PM (end of lunch) on Monday November 4th. Take down must occur by 2:00 PM (end of lunch) on Friday November 8th. Any poster not removed by this time will be recycled. Presenters are responsible for creating and printing their own posters (30”x40”). There is no electricity available at individual poster stations. Please be sure batteries are fully charged if you intend to use a tablet, laptop, or other electronic devices during your presentation.

STUDENT PRESENTATION AWARDS

Judges will be US HAB attendees who have volunteered to assess student presentations within their field of expertise. Prizes will be awarded for the following categories:

1. Best Undergraduate Poster Presentation
2. Best Student Oral Presentation (and runner up)
3. Best Graduate Poster Presentation (and runner up)
4. Best Speed Talk Presentation

The award ceremony will be held at the Conference Awards & Wrap Up on Friday afternoon.

The judge’s feedback will be shared with presenters after the conference.

PLENARY SPEAKERS

In celebration of two decades of the US HAB community meeting biannually at the US HAB symposium, we wanted to celebrate the role of early-mid career women in the sciences. We are pleased to announce three innovative scientists for the plenary lecture series for the 10th US HAB Symposium.

Plenary 1: Morgan STEFFEN

James Madison University

Monday November 4th
12:30 PM – 2:00 PM

THE MICROCYSTIS MICROBIOME:

A SYSTEMS APPROACH TO UNDERSTANDING THE FRESHWATER BLOOM COMMUNITY

The reductionist view of biology has undergone a paradigm shift in recent years to a more holistic, systems-based approach. This shift may be most evident in the rapid expansion of studies characterizing microbial communities associated with environments ranging from termite hind-guts to the McMurdo Dry Valleys. We now know that the interactions within microbial consortia drive global biogeochemical cycling; however, despite these global implications, such interactions occur at a much finer scale. In aquatic systems, interactions between primary producers and bacteria can shift the chemistry of the environment and shape ecosystem function. These interactions primarily take place in the phycosphere, a microenvironment surrounding phytoplankton analogous to the rhizosphere in terrestrial environments. Primary production by aquatic phototrophs supports the growth of heterotrophic organisms, including bacterioplankton. Indeed, the ability of phytoplankton exudates to sustain heterotrophic bacteria was determined as early as 1933. Until recently, this was thought to be the driving force in the development of the phycosphere: heterotrophic bacteria consume carbohydrate-rich phytoplankton exudates. The relationship, however, is more likely mutualistic, facilitating bidirectional exchange of carbon, nitrogen, phosphorus, and other essential nutrients, and potentially driving co-evolution of phycosphere partners.

The intimate relationship between cyanobacteria and co-occurring bacterioplankton has long been recognized. Numerous studies have now applied the "-omics" toolbox to characterize the microbial community associated with cyanobacterial harmful algal blooms (cHABs) around the world, with a focus on blooms of *Microcystis*. However, we now have the power to move beyond simple characterization of the potential players in these microbial interactions to resolving the mechanism of exchange and communication within the freshwater phycosphere. We have isolated a library of potential bacterial partners from *Microcystis* blooms on two continents, allowing us to conduct a series of experiments to document growth promoting activity and nutrient exchange in the freshwater phycosphere.

Biography: Morgan is an Assistant Professor of Biology at James Madison University in Harrisonburg, Virginia where she uses a systems biology approach to examine microbial interactions and nutrient cycling in freshwater cyanobacterial harmful algal blooms in systems such as Lake Erie and Lake Taihu.

Plenary 2: Meredith HOWARD

California Water Board

Tuesday November 5th
10:45 AM – 12:30 PM

APPROACHES AND CHALLENGES

OF MONITORING HAB TOXINS ACROSS THE FRESHWATER-MARINE CONTINUUM

Many coastal states throughout the U.S. have experienced negative impacts in the marine environment due to cyanotoxins produced in upstream inland waterbodies. Cyanotoxins produced in inland waters and transported downstream provide an under-recognized source of cyanotoxins to downstream receiving waters that include rivers, streams, lakes, reservoirs, wetlands, estuaries and coastal lagoons. The conventional focus of HAB monitoring programs has been to analyze toxins according to the waterbody type sampled, either as marine toxins or freshwater toxins, but not both.

Monitoring efforts in California have shown the persistent detection of cyanotoxins temporally (months, seasons, and years) and spatially (multiple systems and regions), which indicates a high risk for bioaccumulation into marine food webs. These studies underscore the importance of inland waters as potential conduits for transfer of cyanotoxins to the marine environment and highlight the importance of novel approaches to monitoring across different waterbodies. HAB monitoring approaches and strategies have been developed to address the challenges of integrated monitoring across the freshwater-marine continuum. The monitoring approaches implemented in California focus on multi-toxin monitoring across the freshwater-marine continuum and include a variety of sampling modalities to capture toxin dynamics and transport.

Successful management and mitigation of HABs needs to occur cohesively across hydrologically interconnected waterbodies due to toxin transport and impacts downstream of the biological origin of blooms. The development of an integrated, multi-toxin HAB monitoring strategy across the freshwater-marine continuum will be discussed as well as the challenges to implementing such a strategy.

Biography: Meredith Howard works with water quality regulatory agencies (federal, state, and local), California Tribes, and the scientific community to develop mitigation and management strategies for both marine and freshwater HABs. Her research focuses on the transport of cyanotoxins across the freshwater-to-marine continuum and the improvement of monitoring tools that can address the challenges of monitoring interconnected waterbodies and watersheds. These systems typically traverse multiple management boundaries and state and country jurisdictions, therefore her goal is the development of HAB monitoring and management strategies that can be applied cohesively across the freshwater-to-marine continuum.

Plenary 3: Stephanie MOORE

NOAA Northwest Fisheries Science Center

Wednesday November 6th
12:30 PM – 2:00 PM

TOWARDS A SOCIAL-ECOLOGICAL SYSTEMS

APPROACH TO ADDRESSING CLIMATE IMPACTS ON HABS

Marine and aquatic environments provide a range of tangible and intangible benefits to human communities, including the provision of food, economic benefits from tourism and fisheries, and a sense of place and cultural identity. Harmful algal blooms put these socio-ecological connections at risk, with sharp consequences for people who depend on impacted resources. Efforts to prepare for and respond to HABs have largely focused on minimizing the direct impacts to human health; however, work to characterize and reduce the social, cultural, and economic impacts of HABs have been slower to emerge. Consequently, providing the most effective assistance to impacted communities and supporting the development of adaptation strategies to build resilience to future HABs is a challenge for regulating and governing agencies. This plenary talk will explore the social dimensions of the unprecedented 2015 West Coast HAB of *Pseudo-nitzschia* using a social-ecological systems framework, which probes aspects of resilience and wellbeing. This approach reveals mechanisms that can amplify or dampen the societal impacts of HABs and the ability of human communities to respond to and recover from them. The results provide a foundation for preparing communities for future HABs, which are expected to worsen along the West Coast as a result of climate change, but more human dimensions research is needed to inform efforts mitigate their impacts and aid recovery of impacted communities.

Biography: Stephanie Moore works with coastal communities to build resilience to HABs by providing early warning of toxic blooms and identifying risk reduction strategies for fishery-dependent communities many of which face significant social and environmental health challenges that are expected to worsen as a result of climate change. She uses high resolution climate and weather information as well as data generated by robotic biosensors to gain a predictive understanding of HABs and their interaction with the marine environment.

SCIENTIFIC PROGRAM

MONDAY NOVEMBER 4th, 2019

Innovation in HAB Detection

8:30 AM – 10:15 AM Session 1 Track A — Ballroom 1
Session Chair: Michael BROSNAHAN

8:30 AM — 8:45 AM **Kaytee POKRZYWINSKI**
HYPERSPECTRAL IMAGING OF CYANOBACTERIA: TAKING IT FROM THE LABORATORY TO THE FIELD

8:45 AM — 9:00 AM **Gregory DOUCETTE**
THE 3RD GENERATION ESP/LONG-RANGE AUV: FIRST TESTS OF AUTONOMOUS, UNDERWAY SAMPLING AND ANALYSIS OF MICROCYSTIN IN WESTERN LAKE ERIE

9:00 AM — 9:15 AM **Zacharias J. SMITH**
MULTI-METHOD COMPARISON FOR THE DETECTION FRESHWATER PARALYTIC SHELLFISH TOXINS IN NEW YORK STATE LAKES

9:15 AM — 9:30 AM **Bruce A. KEAFER**
EARLY WARNING OF SHELLFISH TOXICITY ALONG THE EASTERN MAINE COAST USING ENVIRONMENTAL SAMPLE PROCESSORS (ESPS): EVALUATION OF THE "LEAKY GYRE" HYPOTHESIS

9:30 AM — 9:45 AM **Scott M. GALLAGER**
DYNAMICS OF A CYANOBACTERIA COMMUNITY AND DETECTION OF MYCROCYSTIN-LR IN SANTUIT POND, MASHPEE, MA MEASURED BY HABSTATS, AN IMAGING RAMAN FLOW CYTOMETER

9:45 AM — 10:00 AM **Megan LADDS**
USE OF AN IMAGING FLOWCYTOBOT TO ASSESS DIFFERENTIAL GRAZING BY ZOOPLANKTON DURING THE HARMFUL *DINOPHYSIS ACUMINATA* BLOOMS ON LONG ISLAND, NEW YORK

10:00 AM — 10:15 AM **Tobias BOEHME**
DETERMINATION OF DIFFERENT ALGAL GROUPS WITH SPECIAL EMPHASIS ON CYANOBACTERIA AND THEIR TOXINS IN NATURAL WATERS

Bloom Dynamics & Drivers I

8:30-10:15am Session 1 Track B — Ballroom 2

Session Chair: Kimberly REECE

8:30 AM — 8:45 AM **Emily R. HALL**
LONG-TERM NUTRIENT TRENDS IN THE GULF OF MEXICO IN RELATION TO FLORIDA RED TIDE

8:45 AM — 9:00 AM **Natasha S. BARTENEVA**
MODELING OF CYANOBACTERIAL BLOOM DYNAMICS IN MESOCOSM EXPERIMENT

9:00 AM — 9:15 AM **Rebecca ROGERS**
UNDERSTANDING THE CONTRIBUTION OF BENTHIC FLUXES TO THE PROLIFERATION OF HABS FORMED BY MULTIPLE GENERA OF DINOFLAGELLATE

9:15 AM — 9:30 AM **Brittany N. ZEPERNICK**
M. AERUGINOSA BLOOM-INDUCED PH EFFECTS ON FRESHWATER DIATOMS

9:30 AM — 9:45 AM **Margaret R. MULHOLLAND**
INTERANNUAL VARIABILITY IN BLOOMS OF *MARGILEFIDINIUM POLYKRIKOIDES* IN THE SOUTHERN CHESAPEAKE BAY

9:45 AM — 10:00 AM **Bobby DUERSCH**
BIOAVAILABILITY OF ORGANIC PHOSPHORUS COMPOUNDS WITH RESPECT TO THE GROWTH KINETICS OF *MICROCYSTIS AERUGINOSA*

10:00 AM — 10:15 AM **Sugandha SHANKAR**
PYRODINIUM BAHAMENSE GROWTH AND TOXICITY IN TWO GEOGRAPHICALLY DISTINCT POPULATIONS OF FLORIDA

Cell and Molecular Advances

10:45 AM — 12:30 PM Session 2 Track A — Ballroom 1
Session Chair: Dianne GREENFIELD

10:45 AM — 11:00 AM **Allen R. PLACE**
BEYOND THE TRANSCRIPTOMES: BIOCHEMICAL AND PROTEOMIC VALIDATION OF THE PKS MACHINERY INVOLVED IN STEROLYSIN PRODUCTION

11:00 AM — 11:15 AM **Katherine A. PERRI**
DEVELOPMENT OF UNIVERSAL PCR PRIMER SUITES FOR THE RAPID DETECTION OF ANATOXIN-A AND MICROCYSTIN-RELATED GENES IN FRESHWATER CYANOBACTERIAL COMMUNITIES

11:15 AM — 11:30 AM **Wayne LITAKER**
PROPOSAL FOR DEFINING DINOFLAGELLATE SPECIES BASED PRIMARILY ON MOLECULAR CRITERIA

11:30 AM — 11:45 AM **Schonna R. MANNING**
OMICS-BASED TOOLKIT FOR MONITORING THE GOLDEN ALGA *PRYMNESUM PARVUM* (HAPTOPHYTA) AND ITS TOXIC METABOLITES, PRYMNESINS

11:45 AM — 12:00 PM **Bob YORK**
OBTAINING BIOMASS FROM DIFFICULT TO GROW, SENSITIVE MICROALGAE IN PHOTOBIOREACTORS: *KARENIA BREVIS* AS A CASE STUDY

12:00 PM — 12:15 PM **Ryan W. HUNT**
ALGIX BIOPLASTIC CONVERSION OF ALGAE BIOMASS INTO BLOOM FOAM

12:15 PM — 12:20 PM | PS1 & PS3 **Dominique S. DERMINIO**
EFFECT OF MICROCYSTIN ON THE PHYCOBILISOME ANTENNA COMPLEX IN *MICROCYSTIS* SPP.

12:20 PM — 12:25 PM | PS1 & PS3 **Julius E. SCHNEIDER**
SIMULTANEOUS EXTRACTION AND SEPARATION OF CHLOROPHYLL AND PHYCOCYANINE FROM CYANOBACTERIA WITH OCTANOL-WATER: STABILITY AND HIGH-RESOLUTION FLUORESCENCE STUDIES

Bloom Dynamics & Drivers II

10:45 AM — 12:30 PM Session 2 Track B Ballroom 2
Session Chair: Alan WILSON

10:45 AM — 11:00 AM **Cynthia A. HEIL**
POTENTIAL 'NEW' NITROGEN AND PHOSPHORUS INPUTS TO THE 2018 *KARENIA BREVIS* BLOOM FROM LAKE OKEECHOBEE DISCHARGES AND THE DISPLACED *MICROCYSTIS AERUGINOSA* BLOOM

11:00 AM — 11:15 AM **Alexis D. FISCHER**
RETURN OF THE "AGE OF DINOFLAGELLATES": DRIVERS OF UNUSUAL DINOFLAGELLATE DOMINANCE IN NORTHERN MONTEREY BAY EXAMINED USING AUTOMATED IMAGING FLOW CYTOMETRY

11:15 AM — 11:30 AM **Kenneth C. HAYES**
A POTENTIAL RESERVOIR FOR THE BROWN TIDE ORGANISM, *AUREOUMBRA LAGUNENSIS*, IN A EUTROPHIC SOUTH TEXAS ESTUARY, BAFFIN BAY

11:30 AM — 11:45 AM **Brady K. SKAGGS**
MONITORING AND SURVEILLANCE OF THE 2019 ALGAL BLOOM IN LAKE PONTCHARTRAIN

11:45 AM — 12:00 PM **Molly M. MILLER**
SPATIOTEMPORAL TRENDS AND ENVIRONMENTAL DRIVERS OF CYANOBACTERIAL BLOOMS AND MICROCYSTIN PRODUCTION IN THE NORTHERN GULF OF MEXICO FROM THE 2019 BONNET CARRÉ SPILLWAY RELEASE

12:00 PM — 12:15 PM **J. William LOUDA**
TAYLOR CREEK: NUTRIENT POLLUTION FEEDING CYANOHABS IN LAKE OKEECHOBEE FLORIDA

12:15 PM — 12:20 PM | PS1 & PS3 **Amanda K. WILLIAMS**
DOES *DINOPHYSIS ACUMINATA* PREY ON THE RAPHIDOPHYTE, *HETEROSIGMA AKASHIWO*?

12:20 PM — 12:25 PM | PS1 & PS3 **Felicia OSBURN**
WHAT HAPPENS WHEN THE OCEAN AND TOXIC HABS MIX? AN EXPERIMENTAL ASSESSMENT

Method Validation and Reference Materials

2:00 PM — 4:00 PM Session 3 Track A — Ballroom 1

Session Chair: Pearse MCCARRON, John RAMSDELL

2:00 PM — 2:15 PM **Pearse MCCARRON**

METHOD VALIDATION AND REFERENCE MATERIALS: ACTIVITIES AND NEEDS IN THE HAB COMMUNITY

2:15 PM — 2:30 PM **Sarah R. BICKMAN**

RAPID, MULTIPLEXED DETECTION OF ALGAL TOXINS IN SHELLFISH AND SEAWATER

2:30 PM — 2:45 PM **Leanne FLEWELLING**

INTEGRATION OF AN ALTERNATIVE METHOD OF BREVETOXIN ANALYSIS INTO NEUROTOXIC SHELLFISH POISONING MONITORING AND MANAGEMENT IN THE GULF OF MEXICO

2:45 PM — 3:00 PM **Stuart OEHRLE**

EXPANDED ANALYSIS OF CYANOBACTERIAL TOXINS IN RECREATIONAL AND DRINKING WATER USING UPLC/MS/MS DETECTION…MORE TOXINS!

3:00 PM — 3:15 PM **Andrew D. TURNER**

INTERNATIONAL VALIDATION OF THE UHPLC-HILIC-MS/MS DETERMINATION OF PSP TOXINS AND TETRODOTOXINS IN BIVALVE MOLLUSC SHELLFISH

3:15 PM — 3:30 PM **Elizabeth M. MUDGE**

APPLICATION OF RETENTION INDEX STANDARDS IN CIGUATOXIN RELATED FISH AND ALGAL SAMPLES

3:30 PM — 4:00 PM **MIXED PANEL**

USER OPINIONS AND ROUND TABLE DISCUSSION

Elizabeth HAMELIN (CDC)
Maggie BROADWATER (NOAA)
Greg BOYER (SUNY)
Raphael KUDELA (UCSC)
John RAMSDELL (NOAA)

Bloom Dynamics & Drivers III

2:00 PM — 3:45 PM Session 3 Track B — Ballroom 2

Session Chair: Dave HAMBRIGHT

2:00 PM — 2:15 PM **John L. FERRY**

A YEAR IN THE LIFE OF A *LYNGBYA WOLLEI* BLOOM IN LAKE WATEREE, SC: TOXINS, TRENDS, AND FATES

2:15 PM — 2:30 PM **Chetan C. GAONKAR**

DIVERSITY AND DYNAMICS OF HARMFUL ALGAL BLOOM SPECIES IN THE GULF OF MEXICO FOLLOWING HURRICANE HARVEY

2:30 PM — 2:45 PM **Keith A. LOFTIN**

POLYPHASIC EVIDENCE FOR CYLINDROSPERMOPSIN PRODUCTION BY *CYLINDROSPERMOPSIS RACIBORSKII* AT MATTAMUSKEET NATIONAL WILDLIFE REFUGE, NORTH CAROLINA, USA

2:45 PM — 3:00 PM **Kimberly S. REECE**

PATTERNS AND IMPACTS OF SUMMER BLOOMS IN THE LOWER CHESAPEAKE BAY

3:00 PM — 3:15 PM **Michelle J. NEUDECK**

COMMUNITY EXPRESSION IN A DIEL STUDY OF A *MICROCYSTIS AERUGINOSA* BLOOM IN LAKE ERIE 2014

3:15 PM — 3:30 PM **Michelle D. ONOFRIO**

SPATIAL AND TEMPORAL DISTRIBUTION OF PHYCOTOXINS IN THE CHESAPEAKE

3:30 PM — 3:45 PM **Avery N. LAMB**

SURVEY OF CYANOBACTERIAL PARAMETERS IN FLORIDA SURFACE SEDIMENTS

TUESDAY NOVEMBER 5th, 2019

Predictive Models & Forecasting

8:30 AM — 10:15 AM Session 4 Track A — Ballroom 1
Session Chair: Michael PARSONS

8:30 AM — 8:45 AM **Justin CHAFFIN**
FORECASTING LAKE ERIE CYANOBACTERIAL BLOOM TOXICITY

8:45 AM — 9:00 AM **Gary J. KIRKPATRICK**
OBSERVED CORRELATION BETWEEN SUNSPOT NUMBERS AND INTENSE BLOOMS OF *KARENIA* SP. ON THE WEST FLORIDA SHELF

9:00 AM — 9:15 AM **Riley P. BULEY**
PREDICTING MICROCYSTIN OCCURRENCE IN FRESHWATER LAKES AND RESERVOIRS ON GLOBAL SCALE USING MACHINE LEARNING AND GENERALIZED ADDITIVE MODELING

9:15 AM — 9:30 AM **Richard P. STUMPF**
REAL-TIME FORECASTS FOR BREVETOXIN RESPIRATORY IRRITATION

9:30 AM — 9:45 AM **Christina FENG CHANG**
USING MULTI-MEDIA MODELING AND MACHINE LEARNING TO ASSESS PARAMETERS ASSOCIATED WITH HARMFUL ALGAL BLOOMS

9:45 AM — 10:00 AM **Katherine HUBBARD**
DEMONSTRATION OF AN INTEGRATED OBSERVATION AND FORECASTING NETWORK DURING THE 2017-2019 *KARENIA BREVIS* BLOOM

10:00 AM — 10:15 AM **Todd R. MILLER**
MODELING MICROCYSTIN CONCENTRATION IN GREEN BAY, LAKE MICHIGAN USING HIGH FREQUENCY BUOY DATA AND HYDRODYNAMIC MODEL OUTPUTS

Microbial Interactions

8:30 AM — 10:15 AM Session 4 Track B Ballroom 2
Session Chair: Deana ERDNER

8:30 AM — 8:45 AM **Carrie E. GIVENS**
SHIFTS IN MICROBIAL COMMUNITY COMPOSITION AND MICROBIAL MEDIATED PROCESSES WITH CYANOBACTERIAL ALGAL BLOOM FORMATION AND CYANOTOXIN OCCURRENCE

8:45 AM — 9:00 AM **Helena L. POUND**
THE "NEGLECTED VIRUSES" OF TAIHU: ABUNDANT TRANSCRIPTS FOR VIRUSES INFECTING EUKARYOTES AND THEIR POTENTIAL ROLE IN PHYTOPLANKTON SUCCESSION

9:00 AM — 9:15 AM **Katherine COOK**
A SURVEY OF THE GLOBAL *MICROCYSTIS* MICROBIOME

9:15 AM — 9:30 AM **Matthew F. GLADFELTER**
CHANGES IN SUPPORTIVE BACTERIAL ASSEMBLAGES IN RESPONSE TO NUTRIENT FORM AND CONCENTRATION IN CYANOBACTERIAL COMMUNITIES

9:30 AM — 9:45 AM **Nastassia V. PATIN**
MICROBIOME AND CHEMICAL DYNAMICS OF A TOXIC DINOFLAGELLATE BLOOM

9:45 AM — 10:00 AM **Jennifer G. JANKOWIAK**
MICROCYSTIS COLONIES HARBOR MICROBIOMES LESS DIVERSE AND SIGNIFICANTLY DIFFERENT FROM FREE-LIVING AND PARTICLE ATTACHED BACTERIAL COMMUNITIES IN LAKE ERIE AND LAKE AGAWAM, NY

10:00 AM — 10:15 AM **Katelyn MCKINDLES**
ENVIRONMENTAL EFFECTS ON PARASITIC INFECTIONS BY CHYTRIDS ON *PLANKTOTHRIX AGARDHII*

WEDNESDAY NOVEMBER 6th, 2019

Ecophysiology I

8:30 AM — 10:15 AM Session 5 Track A — Ballroom 1
Session Chair: Christopher GOBLER

8:30 AM — 8:45 AM **Sonya DYHRMAN**
TRACKING PATTERNS OF PHYSIOLOGICAL ECOLOGY IN *AUREOCOCCUS* AND ITS COMPETITORS OVER THE COURSE OF A BLOOM

8:45 AM — 9:00 AM **Ewaldo LEITAO**
TOP-DOWN REGULATION OF FILAMENTOUS CYANOBACTERIA CONTRASTS AMONG RAPTORIAL VS. ACTIVE FILTER FEEDING COPEPODS

9:00 AM — 9:15 AM **Erik L.J.E. BROEMSEN**
DISRUPTING THE CYCLE: DOES MIXOTROPHY DESYNCHRONIZE CELL DIVISION IN *KARLODINIUM VENEFICUM*?

9:15 AM — 9:30 AM **Catharina ALVES-DE-SOUZA**
TEMPERATURE AFFECTS THE BIOLOGICAL CONTROL OF DINOFLAGELLATE BLOOMS BY A GENERALIST PARASITE

9:30 AM — 9:45 AM **Mengmeng TONG**
CELL CYCLE REGULATION OF THE MIXOTROPHIC DINOFLAGELLATE *DINOPHYSIS ACUMINATA*: GROWTH, PHOTOSYNTHETIC EFFICIENCY AND TOXIN PRODUCTION

9:45 AM — 10:00 AM **Peter H. SYLVERS**
ALLELOPATHIC INHIBITION OF THE HARMFUL DINOFLAGELLATE *ALEXANDRIUM CATENELLA* BY MULTIPLE SPECIES OF CULTIVABLE MACROALGAE

10:00 AM — 10:05 AM | PS2 & PS3 **Jessica K. GWINN**
DMSP PRODUCTION IN *GAMBIERDISCUS* SPP. EFFECT OF SALINITY AND VARIATION WITHIN THE GENUS

10:05 AM — 10:10 AM | PS2 & PS3 **Gihong PARK**
INTERACTION OF GRAZER EXPOSURE AND NUTRIENT REGIME ON TOXIN PRODUCTION AND GROWTH IN *ALEXANDRIUM CATENELLA*

Monitoring & Management I

8:30 AM — 10:15 AM Session 5 Track B Ballroom 2
Session Chair: Holly BOWERS

8:30 AM — 8:45 AM **Barbara KIRKPATRICK**
THE GCOOS-RA HAB PRODUCTS AND SERVICES

8:45 AM — 9:00 AM **Katie J. VIGIL**
HOW TO DEVELOP A CYANOTOXIN RESPONSE PLAN USING A TRIGGER BASED SYSTEM FOR YOUR DRINKING WATER TREATMENT PLANTS

9:00 AM — 9:15 AM **Theo W. DREHER**
COMBINED LONG- AND SHORT-READ DNA SEQUENCING OF CYANOHAB LAKE SAMPLES REVEALS GENOME SEQUENCE AND POPULATION STRUCTURE OF EXTANT PACIFIC NW BLOOMS

9:15 AM — 9:30 AM **H. Joel ALLEN**
OBSERVATIONS ON A MULTI-YEAR DATASET FROM A MID-LATITUDE RESERVOIR EXPERIENCING HAB EVENTS

9:30 AM — 9:45 AM **Chris KELBLE**
ENGAGING COMMERCIAL FISHERMEN TO FILL CRITICAL MONITORING GAPS FOR RED TIDE

9:45 AM — 10:00 AM **Arohi SHARMA**
WHAT'S LURKING IN YOUR LAKE? AN ASSESSMENT OF STATES' FRESHWATER HARMFUL ALGAL BLOOM PROGRAMS

10:00 AM — 10:15 AM **Jonathan JACKSON**
THE HARMFUL ALGAL BLOOMS OBSERVATION SYSTEM (HABSOS), A HAB DATABASE AND DISTRIBUTION PLATFORM

Ecophysiology II

10:45 AM — 12:30 PM Session 6 Track A Ballroom 1
Session Chair: Justin CHAFFIN

10:45 AM — 11:00 AM **Barry ROSEN**
UNDERSTANDING THE EFFECT OF SALINITY TOLERANCE ON CYANOBACTERIA ASSOCIATED WITH A HARMFUL ALGAL BLOOM IN LAKE OKEECHOBEE, FLORIDA

11:00 AM — 11:15 AM **Yida GAO**
THE EFFECTS OF ENVIRONMENTAL STRESSORS ON CELL DEATH RESPONSES OF TOXIC DINOFLAGELLATE *KARENIA BREVIS* AND POTENTIAL BLOOM DECLINE PROCESSES

11:15 AM — 11:30 AM **Lauren E. KRAUSFELDT**
DIFFERENT PHYSIOLOGICAL RESPONSES AND TOXICITY RELATED TO N-SPECIATION ARE REVEALED BY TRACING LABELED N THROUGH THE METABOLOME OF *MICROCYSTIS AERUGINOSA*

11:30 AM — 11:45 AM **Rachel A. BREWTON**
NUTRIENT OVER-ENRICHMENT AND BROWN TIDE RESULT IN LIGHT LIMITATION OF SEAGRASS COMMUNITIES IN THE INDIAN RIVER LAGOON

11:45 AM — 12:00 PM **Robbie M. MARTIN**
REDUCED LIGHT INTENSITY COUNTERACTS THE COOL-TEMPERATURE-INDUCED INCREASE IN MICROCYSTIN QUOTA OF *MICROCYSTIS AERUGINOSA*

12:00 PM — 12:15 PM **Nicole D. WAGNER**
BIOLOGICAL STOICHIOMETRY REGULATES TOXIN PRODUCTION IN *MICROCYSTIS AERUGINOSA*

12:15 PM — 12:20 PM | PS2 & PS3 **Deana ERDNER**
DIVERSITY AND DYNAMICS OF MACROALGAL EPIPHYTE COMMUNITIES

12:20 PM — 12:25 PM | PS2 & PS3 **Alexander LEYNSE**
THE CONTRIBUTION OF EPIPHYTIC DINOFLAGELLATES TO THE CHEMOECOLOGY OF THE MACROPHYTE *HOLOBIONT*

Monitoring & Management II

10:45 AM — 12:30 PM Session 6 Track B Ballroom 2
Session Chair: Timothy DAVIS

10:45 AM — 11:00 AM **Thad SCOTT**
ENVIRONMENTAL AND BIOLOGICAL CONTROLS ON NITROGEN-RICH TOXIN PRODUCTION BY DIAZOTROPHIC AND NON-DIAZOTROPHIC CYANOBACTERIA

11:00 AM — 11:15 AM **Christopher T. NIETCH**
A FLOW-BASED RISK CHARACTERIZATION MODEL FOR HABS ON THE OHIO RIVER

11:15 AM — 11:30 AM **Nicolaus G. ADAMS**
AZADINIUM SPINOSUM AND *AZADINIUM POPORUM* IN THE INLAND AND COASTAL WATERS OF THE PACIFIC NORTHWEST FROM 2014-2018

11:30 AM — 11:45 AM **Reagan M. ERRERA**
ESTABLISHING A NETWORK OF ADVANCE TECHNOLOGIES: LONG-TERM MONITORING OF CYANOBACTERIA BLOOMS IN THE GREAT LAKES

11:45 AM — 12:00 PM **Darren HENRICHS**
APPLICATION OF A CONVOLUTIONAL NEURAL NETWORK FOR IMAGE CLASSIFICATION TO IMPROVE AUTOMATED EARLY WARNING NOTIFICATIONS OF HABS FROM THE IMAGING FLOWCYTOBOT (IFCB)

12:00 PM — 12:15 PM **Matt GARRETT**
PRELIMINARY USE OF SOLID PHASE ADSORPTION TOXIN TRACKING (SPATT) FOR BREVETOXINS IN THE HYPOTHESIZED FORMATIVE REGION OF *KARENIA BREVIS* BLOOMS

12:15 PM — 12:20 PM | PS2 & PS3 **Edna G. FERNANDEZ-FIGUEROA**
DRONE IMAGERY FOR ALGAL BLOOM MONITORING

12:20 PM — 12:25 PM | PS1 & PS3 **Sarah CAYWOOD**
REDUCING THE OCCURRENCE OF HABS THROUGH LOW IMPACT DEVELOPMENT

Climate I

2:00 PM — 3:45 PM Session 7 Track A — Ballroom 1
Session Chair: Greg DOUCETTE

2:00 PM — 2:15 PM **Hans W. PAERL**
MITIGATING HARMFUL CYANOBACTERIAL BLOOMS IN A HOTTER, HYDROLOGICALLY MORE-EXTREME WORLD

2:15 PM — 2:30 PM **Pat GLIBERT**
CLIMATE- INDUCED INTERANNUAL VARIABILITY AND LONG-TERM CHANGE IN SEVERAL COMMON HABS OF CHESAPEAKE BAY

2:30 PM — 2:45 PM **Timothy W. DAVIS**
THE ROLE OF SURFACE WATER WARMING IN THE TIMING OF THE *MICROCYSTIS*-DOMINATED CYANOBACTERIAL BLOOMS IN WESTERN LAKE ERIE

2:45 PM — 3:00 PM **Hans G. DAM**
WILL *ALEXANDRIUM* THRIVE IN A GREENHOUSE WORLD? IT'S COMPLICATED

3:00 PM — 3:15 PM **Benjamin J. KRAMER**
THE EFFECT OF CLIMATE CHANGE AND EUTROPHICATION ON *DOLICHOSPERMUM* A HARMFUL, DIAZOTROPHIC CYANOBACTERIAL GENUS

3:15 PM — 3:30 PM **Michael L. BROSNAHAN**
MODEL OF HEATING- AND CHILLING-BASED DORMANCY CONTROLS IN *A. CATENELLA* CYSTS

3:30 PM — 3:45 PM **Paul G. MATSON**
BIOPHYSICAL DRIVERS FACILITATING A TOXIGENIC CYANOBACTERIAL BLOOM IN A MAJOR GREAT LAKES TRIBUTARY

Mitigation & Control I

2:00 PM — 3:45 PM Session 7 Track B Ballroom 2
Session Chair: Leanne FLEWELLING

2:00 PM — 2:15 PM **Vijay T. JOHN**
A TWO-DIMENSIONAL MOLECULARLY THIN SKIN TO FLOCCULATE AND SINK HARMFUL ALGAE

2:15 PM — 2:30 PM **Jana WIESCHOLLEK**
VARIABILITY IN THE EFFECTS OF ALGICIDAL BACTERIA ON *KARENIA BREVIS*

2:30 PM — 2:45 PM **Catie ADAMS**
EVALUATING DIFFERENT APPROACHES FOR CONTROLLING TOXIC ALGAL BLOOMS

2:45 PM — 3:00 PM **Yanfei WANG**
IMMOBILIZATION OF ALGICIDAL BACTERIUM *SHEWANELLA* SP. IRI-160 AND ITS APPLICATION TO CONTROL HARMFUL DINOFLAGELLATES

3:00 PM — 3:15 PM **Vincent J. LOVKO**
OVERVIEW OF MULTIPLE CONTROL STRATEGIES FOR BLOOMS OF *KARENIA BREVIS* ON THE FLORIDA GULF COAST

3:15 PM — 3:30 PM **Kate KOHLER HARRISON**
A REVIEW OF LOCAL, STATE, AND FEDERAL *KARENIA BREVIS* PREVENTION, CONTROL, AND MITIGATION RESEARCH FROM 2009 TO PRESENT

3:30 PM — 3:35 PM | PS1 & PS3 **Taylor ARMSTRONG**
THE USE OF BREWER'S SPENT GRAIN TO INHIBIT *MICROCYSTIS AERUGINOSA* BLOOMS AND LC-MS/MS ANALYSIS OF THE INHIBITORY COMPOUNDS

3:35 PM — 3:40 PM | PS1 & PS3 **Chelsey I. BOMAR**
A *KARENIA BREVIS* MITIGATION STRATEGY USING NATURAL COMPOUNDS DERIVED FROM MACROALGAE

THURSDAY NOVEMBER 7th, 2019

Climate II

8:30 AM — 10:15 AM Session 8 Track A Ballroom 1
Session Chair: Clarissa ANDERSON

8:30 AM — 8:45 AM **Donald M. ANDERSON**
EVIDENCE FOR MASSIVE AND RECURRENT TOXIC BLOOMS OF *ALEXANDRIUM CATENELLA* IN THE ALASKAN ARCTIC

8:45 AM — 9:00 AM **Matthew N. WATERS**
HABS THEN AND NOW: COMPARING HISTORIC AND MODERN CYANOBACTERIA DYNAMICS OVER THE LAST 5000 YEARS USING THE SEDIMENT RECORD

9:00 AM — 9:15 AM **Christopher J. GOBLER**
HARMFUL ALGAL BLOOMS: A CLIMATE CHANGE CO-STRESSOR IN MARINE AND FRESHWATER ECOSYSTEMS

9:15 AM — 9:30 AM **Elizabeth J. FAVOT**
USING SEDIMENTARY DIATOM AND CHIRONOMID ASSEMBLAGES TO DETERMINE THE ENVIRONMENTAL TRIGGERS FOR RECENT CYANOBACTERIAL BLOOMS IN CALLANDER BAY, LAKE NIPISSING, ONTARIO

9:30 AM — 9:45 AM **Raphael M. KUDELA**
RESOLVING THE APPARENT PARADOX OF TEMPERATURE AND *PSEUDO-NITZSCHIA* EVENTS

9:45 AM — 10:00 AM **Paula C. FUREY**
HOW TEMPERATURE AND NUTRIENTS INTERACT TO REGULATE THRESHOLDS OF CHANGE BETWEEN CYANOBACTERIA AND DIATOMS IN STREAM ECOSYSTEMS

10:00 AM — 10:15 AM **Brian E. LAPOINTE**
THE BIGGEST ALGAE BLOOM ON EARTH: DEVELOPMENT OF THE GREAT ATLANTIC *SARGASSUM* BELT

Mitigation & Control II

8:30 AM — 10:15 AM Session 8 Track B Ballroom 2

Session Chair: Matthew WATERS

8:30 AM — 8:45 AM **Susan LAUNAY**

OZONE FOR ON-SITE RESPONSE, REMEDIATION, AND MITIGATION OF RED TIDES: FEASIBILITY STUDY

8:45 AM — 9:00 AM **Kathryn J. COYNE**

EFFECTS OF DINOFLAGELLATE-SPECIFIC ALGICIDE (IRI-160AA) ON MICROBIAL COMMUNITIES: A NEXT GENERATION SEQUENCING APPROACH

9:00 AM — 9:15 AM **I-Shuo W. HUANG**

IS THERE AN ECO-FRIENDLY TREATMENT TO CONTROL CYANOBACTERIAL HARMFUL ALGAL BLOOMS?

9:15 AM — 9:30 AM **Alan E. WILSON**

CAN INTAKE DEPTH BE USED AS A TOOL FOR MANAGING TOXIC CYANOBACTERIAL BLOOMS IN SURFACE DRINKING WATER RESERVOIRS?

9:30 AM — 9:45 AM **Katherine FOREMAN**

EFFECTS OF HARMFUL ALGAL BLOOMS ON REGULATED DISINFECTION BYPRODUCTS: FINDINGS FROM UTILITY CASE STUDIES

9:45 AM — 10:00 AM **Sarah PEASE**

IMPLICATIONS FOR HATCHERY MANAGEMENT OF HARMFUL ALGAL BLOOMS: INTERACTIONS BETWEEN *KARLODINIUM VENEFICUM*, HATCHERY FEED ALGAE, AND EASTERN OYSTER LARVAE (*CRASSOSTREA VIRGINICA*)

Food Web Dynamics & Impacts

10:45 AM — 12:30 PM Session 9 Track A — Ballroom 1

Session Chair: Marc SUDDLESON

10:45 AM — 11:00 AM **Jayme SMITH**

PERSISTENT DOMOIC ACID IN THE SEDIMENTS AND BENTHIC INFAUNA IN CALIFORNIA

11:00 AM — 11:15 AM **Israel A. MARQUEZ**

MARINE SNOW CONSUMPTION FACILITATES A NOVEL ENTRY PATHWAY FOR DOMOIC ACID INTO THE MARINE FOOD WEB

11:15 AM — 11:30 AM **Steve KIBLER**

PREVALENCE OF PARALYTIC SHELLFISH TOXINS IN THE MARINE FOOD WEB OF SOUTHCENTRAL AND SOUTHWEST ALASKA

11:30 AM — 11:45 AM **Clayton T. BENNETT**

SPATIOTEMPORAL DISTRIBUTION AND TROPHIC LAG OF CARIBBEAN CIGUATOXINS IN FISH SECONDARY CONSUMERS FROM THE US VIRGIN ISLANDS

11:45 AM — 12:00 PM **Kathi A. LEFEBVRE**

ALGAL TOXINS IN ALASKAN ARCTIC FOOD WEBS: SEAWATER, ZOOPLANKTON, BIVALVES, FISH, ICE SEALS, WALRUSES AND WHALES!

12:00 PM — 12:15 PM **Richard D. BARTLESON**

WHAT IS SAFE FOR SEA TURTLES TO EAT DURING AN EXTREME SOUTHWEST FLORIDA RED TIDE?

12:15 PM – 12:20 PM | PS1 & PS3 **John P. BERRY**

IS *SARGASSUM* A VECTOR FOR ENVIRONMENTAL TOXICANTS?

12:20 PM – 12:25 PM | PS1 & PS3 **Cody E. COLE**

THE EFFECT OF RED TIDE (*KARENIA BREVIS*) ON THE FLORIDA STONE CRABS (*MENIPPE MERCENARIA*)

Engaging Citizens & Stakeholders

10:45 AM — 12:30 PM Session 9 Track B Ballroom 2

Session Chair: Barbara KIRKPATRICK

10:45 AM — 11:00 AM **Clarissa R. ANDERSON**

CONNECTING STAKEHOLDERS TO ECOSYSTEM CHANGE WITH HARMFUL ALGAL BLOOM AND HYPOXIA FORECAST MODELS IN THE CALIFORNIA CURRENT SYSTEM

11:00 AM — 11:15 AM **Bridget N. SEEGERS**

THE CYAN MONITORING APP AND OUTREACH TO EDUCATE AND EXCITE PEOPLE ABOUT THE CYANOBACTERIA INDEX

11:15 AM — 11:30 AM **Jason E. ADOLF**

COLLABORATIVE RESEARCH BETWEEN STATE, UNIVERSITY AND CITIZEN SCIENTISTS AIMED AT UNDERSTANDING HABS IN THE GREAT STATE OF NEW JERSEY AND BEYOND

11:30 AM — 11:45 AM **Tracy FANARA**

COMMUNICATING CHAOS: A REVIEW OF SUCCESSES AND DOWNFALLS OF FLORIDA RED TIDE SCIENCE COMMUNICATION AND BREAKING BOUNDARIES THROUGH CITIZEN SCIENCE

11:45 AM — 12:00 PM **Kari LANPHIER**

COMMUNITY-BASED MITIGATION OF HARMFUL ALGAL BLOOMS AND SHELLFISH POISONINGS IN SOUTHEAST ALASKA

12:00 PM — 12:15 PM **Casey DANIEL**

ENHANCING STAKEHOLDER ENGAGEMENT TO IMPROVE CIGUATERA RESEARCH AND MANAGEMENT

12:15 PM — 12:30 PM **Elizabeth DAY**

EVALUATING SCIENCE, EDUCATION, AND OUTREACH PROGRAMS

FRIDAY NOVEMBER 8th, 2019

Special Session: Oceans and Human Health

8:30 AM — 10:15 AM Session 10 Track A — Ballroom

Session Chair: Mindy RICHLEN

8:30 AM — 8:45 AM **Michael L. PARSONS**

A BRIEF INTRODUCTION TO THE CENTERS FOR OCEANS AND HUMAN HEALTH FUNDED THROUGH COHH3: IMPACTS OF CLIMATE CHANGE ON OCEANS AND GREAT LAKES

8:45 AM — 9:00 AM **Mary Carla CURRAN**

HAB SCIENCE MADE EASY: TEACHING STUDENTS ABOUT THE ECOLOGY AND TOXICOLOGY OF HARMFUL ALGAL BLOOMS

9:00 AM — 9:15 AM **Mindy L. RICHLEN**

DEVELOPMENT OF AN INTEGRATED COMMUNITY ENGAGEMENT STRATEGY FOR OCEAN AND HUMAN HEALTH ISSUES ASSOCIATED WITH HABS

9:15 AM — 9:30 AM **Saurabh CHATTERJEE**

EARLY CHILDHOOD EXPOSURE AND PRIMING TO ALGAL TOXINS INDUCE MURINE ADULT HEPATIC INJURY FOLLOWING HIGH FAT DIET FEEDING VIA NLRP3 INFLAMMASOMES

9:30 AM — 9:45 AM **Shuo XIAO**

USE OF A NOVEL OVARY-ON-A-CHIP TO SCREEN FOR FEMALE REPRODUCTIVE TOXICITY OF MICROCYSTINS

9:45 AM — 10:00 AM **Robert SOBOL**

HIGH THROUGHPUT NEXT GENERATION COMETCHIP PLATFORM FOR ASSESSMENT OF FISH AND HUMAN GENOME STABILITY FOLLOWING EXPOSURE TO HARMFUL ALGAL TOXINS

10:00 AM — 10:05AM | PS2 & PS3 **Alia S. HIDAYAT**

DOMOIC ACID EXPOSURE INDUCED TRANSCRIPTIONAL CHANGES IN THE BRAIN – POTENTIAL EFFECTS ON MICROGLIA

10:05 AM — 10:10 AM | PS2 & PS3 **Alicia M. HENDRIX**

EFFECTS OF AGE ON THE SUSCEPTIBILITY TO NEUROBEHAVIORAL TOXICITY FOLLOWING ACUTE DOMOIC ACID EXPOSURE IN A MOUSE MODEL

Animal and Human Health

10:45 AM — 12:30 PM Session 11 Track A Ballroom
Session Chair: Kathi LEFEBVRE

10:45 AM — 11:00 AM **Elizabeth D. HILBORN**
HUMAN ACTIVITY, ENDOTOXINS, AND WATER QUALITY DURING A CYANOBACTERIA BLOOM AT A RECREATIONAL BEACH

11:00 AM — 11:15 AM **Richard H. PIERCE**
INLAND TRANSPORT OF AREOSOLIZED BREVETOXINS FROM *A KARENIA BREVIS* HARMFUL ALGAL BLOOM

11:15 AM — 11:30 AM **Amanda J. FOSS**
MICROCYSTIN INTOXICATION OF CANINES: A CASE STUDY AND ADVANCES IN TESTING

11:30 AM — 11:45 AM **Zachary R. LAUGHREY**
TOXIC HARMFUL ALGAL BLOOMS' IMPACT ON FEDERAL LANDS AND TRUST SPECIES

11:45 AM — 12:00 PM **Bryan W. BROOKS**
COMPARATIVE ASSESSMENT OF CYANOTOXINS OCCURRENCE AND HAZARDS IN INLAND WATERS

12:00 PM — 12:15 PM **Michael L. PARSONS**
DO AIRBORNE MICROCYSTINS PRESENT A HUMAN HEALTH RISK?

POSTER SESSIONS

POSTER SESSION 1 (PS-1): MONDAY 4th NOVEMBER, 2019

POSTER SESSION 2 (PS-2): TUESDAY 5th NOVEMBER, 2019

POSTER SESSION 3 (PS-3): THURSDAY 7th NOVEMBER, 2019

All poster sessions will be held in Grand Reef (Beach Level) from 4:00 PM-6:00 PM on the designated day of presentation.

Refreshments and Snacks will be provided.

LIST OF POSTERS (In alphabetical order)

1. **Ashley ALLEN** PS1 & PS3
   THE INTERACTION OF NITROGEN ENRICHMENT AND PREVIOUS, CURRENT, AND FUTURE CLIMATE SCENARIOS ON THE GROWTH OF *MICROCYSTIS AERUGINOSA* (UTEX 2385)

2. **Rajan ANBIAH** PS1 & PS3
   DINOFLAGELLATE CYSTS SURVEYS USED IN MANAGEMENT OF HARMFUL ALGAL BLOOMS IN TEROTORIAL WATERS OF ABU DHABI, UNITED ARAB EMIRATES

3. **Taylor ARMSTRONG** 7:B 3:30 PM – 3:35 PM | PS1 & PS3
   THE USE OF BREWER'S SPENT GRAIN TO INHIBIT *MICROCYSTIS AERUGINOSA* BLOOMS AND LC-MS/MS ANALYSIS OF THE INHIBITORY COMPOUNDS

4. **Nour AYACHE** PS2 & PS3
   ECOPHYSIOLOGICAL RESPONSES OF *PSEUDO-NITZSCHIA* TOXIC SPECIES TO ENVIRONMENTAL VARIATIONS RELATED TO CLIMATE CHANGE

5. **Katherine L. BALTZER** PS1 & PS3
   BIOMARKERS OF BREVETOXIN EXPOSURE IN *MERCENARIA CAMPECHIENSIS*

6. **Gillian T. BARBER** PS1 & PS3
   IMPACTS OF ENVIRONMENTAL CHANGES ON PHYTOPLANKTON BIODIVERSITY IN DESTIN, FL DURING SUMMER 2019

7. **Natalie S. BARTENEVA** PS2 & PS3
   A FIRST REPORT OF POTENTIALLY TOXIC ALGAL BLOOMS AT URAL RIVER AT KAZAKHSTAN

8. **Emily N. BEERS** PS2 & PS3
   MORE THAN MICROCYSTINS! INVESTIGATING THE EFFECTS OF TEMPERATURE ON THE GROWTH AND TOXIN PRODUCTION OF SAXITOXIN, ANATOXIN AND CYLINDROSPERMOPSIN-PRODUCING CYANOBACTERIA

9. **Mike C. BEISER** PS1 & PS3
   THE SUMMER OF 2019: OVERVIEW OF HARMFUL ALGAL BLOOM THAT AFFECTED MISSISSIPPI'S BEACHES

10. **John P. BERRY** 9:A 12:15 PM – 12:20 PM | PS1 & PS3
    IS *SARGASSUM* A VECTOR FOR ENVIRONMENTAL TOXICANTS?

11. **Charlotte A. BERRY-POWELL** PS1 & PS3
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE: MONITORING, RESPONSE, AND MANAGEMENT TO APPARENT INCREASE IN DOMOIC ACID ALONG THE WASHINGTON COAST

12. **David E. BERTHOLD** PS1 & PS3
MICROCYSTIN-LR BINDING AND SEDIMENTATION USING PHOSLOCK

13. **Ashley N. BOGGS** PS1 & PS3
KARENIA BREVIS EFFECTS ON SOIL MICROBIAL ACTIVITY IN A COASTAL WETLAND ECOSYSTEM

14. **Chelsey l. BOMAR** 7:B 3:35 PM – 3:40 PM | PS1 & PS3
A *KARENIA BREVIS* MITIGATION STRATEGY USING NATURAL COMPOUNDS DERIVED FROM MACROALGAE

15. **Ashley L. BRANDT** PS2 & PS3
CLIMATE CHANGE INFLUENCES ON CONNECTIONS BETWEEN CIGUATERA FISH POISONING AND CORAL REEFS

16. **George S. BULLERJAHN** PS2 & PS3
OCEANS AND HUMAN HEALTH: THE GREAT LAKES CENTER FOR FRESH WATERS AND HUMAN HEALTH

17. **Devin S. BURRIS** PS1 & PS3
IDENTIFICATION AND QUANTIFICATION OF CHEMICAL SIGNALS THAT INDUCE BACTERIAL ALGICIDAL ACTIVITY ON *KARENIA BREVIS*

18. **Haiyuan CAI** PS2 & PS3
BLOOM-FORMING *MICROCYSTIS* HARBOR UNIQUE BACTERIA IN RESPONSE TO HIGH LIGHT AND FLUCTUATING OXYGEN LEVELS

19. **Adam B. CATASUS** PS2 & PS3
DETERMINATION OF THE PRESENCE AND BIOMAGNIFICATION OF CARIBBEAN CIGUATOXINS AND BENTHIC ALGAL TOXINS IN FISHES FROM THE FLORIDA KEYS NATIONAL MARINE SANCTUARY

20. **Sarah CAYWOOD** 6:B 12:20 PM – 12:25 PM | PS1 & PS3
REDUCING THE OCCURRENCE OF HABS THROUGH LOW IMPACT DEVELOPMENT

21. **Suzanna CLARK** PS2 & PS3
PSEUDO-NITZSCHIA BLOOM DYNAMICS IN THE GULF OF MAINE: 2012-2016

22. **Cody E. COLE** 9:A 12:20 PM – 12:25 PM | PS1 & PS3
THE EFFECT OF RED TIDE (*KARENIA BREVIS*) ON THE FLORIDA STONE CRABS (*MENIPPE MERCENARIA*)

23. **Rebecca M. COLEMAN** PS1 & PS3
DETECTION OF ALGAL TOXIN IN CLINICAL SAMPLES: LABORATORY SUPPORT FOR PUBLIC HEALTH

24. **Erin CONLON** PS1 & PS3
DETERMINING THE LIMITING NUTRIENT OF HAB BIOMASS IN BRANCHPORT CREEK, NEW JERSEY

25. **Aspen COOK** PS2 & PS3
REDUCING EFFECTS OF FLORIDA RED TIDE VIA BIOFILTRATION

26. **Brady R. CUNNINGHAM** PS2 & PS3
DETECTION OF BREVETOXIN IN HUMAN PLASMA TO DIAGNOSE POTENTIAL ENVIRONMENTAL EXPOSURES

27. **Erin CUYLER** PS2 & PS3
FLOW-THROUGH EXPERIMENTAL APPROACH FOR INVESTIGATING THE EFFECTS OF OCEAN ACIDIFICATION AND WARMING ON *KARENIA BREVIS*

28. **Dominique DERMINIO** 2:A 12:15 PM – 12:20 PM | PS1 & PS3
EFFECT OF MICROCYSTIN ON THE PHYCOBILISOME ANTENNA COMPLEX IN *MICROCYSTIS* SPP

29. **Allison DEWAN** PS2 & PS3
ULTRASONIC TECHNOLOGY FOR CYANOBACTERIA CONTROL: A PILOT STUDY ON TWO NEW YORK CITY RESERVOIRS

30. **Theo W. DREHER** PS2 & PS3
LAKE SEDIMENT CORE ANALYSIS DATES THE EXPANSION OF ANATOXIN-PRODUCING *ANABAENA/DOLICHOSPERMUM* IN ANDERSON LAKE, WA

31. **Bryndan P. DURHAM** PS2 & PS3
APPLICATION OF HIGH-RESOLUTION METABOLOMICS APPROACHES TO MARINE PHYTOPLANKTON

32. **Robert J. DUSEK** PS2 & PS3
EFFECTS OF SAXITOXIN INGESTION IN A MODEL AVIAN SPECIES

33. **Michael A. ECHEVARRIA** PS1 & PS3
PHOTOSYNTHESIS-IRRADIANCE KINETICS OF *MARGALEFIDINIUM POLYKRIKOIDES*, A POTENTIALLY MIXOTROPHIC HAB SPECIES, IN THE LAFAYETTE RIVER, A SUB-TRIBUTARY OF THE CHESAPEAKE BAY

34. **Michelle L. EDWARDS** PS2 & PS3
EXPOSURE TO MULTIPLE ALGAL TOXINS AMONG RESIDENT BULL SHARKS, *CARCHARHINUS LEUCAS*, IN FLORIDA'S INDIAN RIVER LAGOON

35. **Todd A. EGERTON** PS1 & PS3
ALGAL BLOOM SUCCESSION IN LOWER CHESAPEAKE BAY; ENVIRONMENTAL NICHES AND SEASONAL AND SPATIAL DISTRIBUTIONS

36. **Emily J. EGGLESTON** PS1 & PS3
DETERMINING THE TRENDS AND DRIVERS OF CYANOHABS IN CLEAR LAKE

37. **Deana ERDNER** 6:A 12:15 PM – 12:20 PM | PS2 & PS3
DIVERSITY AND DYNAMICS OF MACROALGAL EPIPHYTE COMMUNITIES IN THE FLORIDA KEYS AND US VIRGIN ISLANDS, 2014-2015

38. **Javiera Sofía ESPINOZA GUMUCIO** PS2 & PS3
DEVELOPMENT OF MOLECULAR MARKERS AND QPCR ASSAYS FOR *ALEXANDRIUM CATENELLA* AND *A. OSTENFELDII* (DINOPHYCEAE) IDENTIFIED FROM PATAGONIAN FJORDS

39. **Tracy FANARA** PS1 & PS3
PROTECTING PUBLIC HEALTH THROUGH CITIZEN SCIENCE: VALIDATION OF NEAR/REAL TIME QUALITATIVE REPORTING OF HAB EFFECTS

40. **Lauren FERGUSON** PS1 & PS3
THE INTERACTION OF NITROGEN ENRICHMENT AND PREVIOUS, CURRENT, AND FUTURE CLIMATE SCENARIOS ON THE BIOLOGICAL STOICHIOMETRY OF *MICROCYSTIS AERUGINOSA* (UTEX 2385)

41. **Edna G. FERNANDEZ-FIGUEROA** 6:B 12:15 PM – 12:20 PM | PS2 & PS3
DRONE IMAGERY FOR ALGAL BLOOM MONITORING

42. **Leah A. GIBALA-SMITH** PS1 & PS3
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44. **Christopher GRASSO** PS2 & PS3
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45. **Dianne I. GREENFIELD** PS1 & PS3
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46. **Jessica K. GWINN** PS1 & PS3
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47. **Jessica K. GWINN** 5:A 10:00 AM – 10:05 AM | PS2 & PS3
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48. **Regina W. HANLON** PS1 & PS3
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50. **Alicia M. HENDRIX** 10:A 10:05 AM – 10:10 AM | PS2 & PS3
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52. **Andrea L. JAMES** PS2 & PS3
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53. **Karen E. KAVANAUGH** PS1 & PS3
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57. Lauren A. KNOSE PS1 & PS3
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60. Mark LEONE PS2 & PS3
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66. **Amanda MUNI-MORGAN** PS1 & PS3
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68. **Robert NEWBY** PS2 & PS3
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69. **Ari NISSANKA** PS1 & PS3
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70. **Stuart OEHRLE** PS2 & PS3
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71. **Felicia OSBURN** 2:B 12:20 PM – 12:25 PM | PS1 & PS3
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72. **Gihong PARK** 5:A 10:05AM – 10:10 AM | PS2 & PS3
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73. **Matthew W. PARROW** PS1 & PS3
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74. **Matthew W. PARROW** PS2 & PS3
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75. **Michael PARSONS** PS2 & PS3
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76. Michael PARSONS PS2 & PS3
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77. Eduardo PEREZ VEGA PS1 & PS3
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78. Kaytee POKRZYWINSKI PS2 & PS3
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79. Skyler POST PS1 & PS3
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80. Molly POWER PS1 & PS3
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81. Emily QUACH PS1 & PS3
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85. Maria RILEY PS2 & PS3
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86. Clara L. ROBISON PS2 & PS3
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88. Julius E. SCHNEIDER 2:A 12:20 PM – 12:25 PM | PS1 & PS3
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91. Margaret J. SMIGO PS2 & PS3
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93. Elizabeth F. SMITH PS1 & PS3
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94. Elizabeth F. SMITH PS2 & PS3
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95. Jasmine K. STOVALL PS1 & PS3
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99. Rebekah WHARTON PS1 & PS3

EVALUATION OF THE SAXITOXIN RECEPTOR BINDING ASSAY FOR MEASURING HUMAN EXPOSURE TO PSP

100. Amanda K. WILLIAMS 2:B 12:15 PM – 12:20 PM | PS1 & PS3

DOES *DINOPHYSIS ACUMINATA* PREY ON THE RAPHIDOPHYTE, *HETEROSIGMA AKASHIWO*?

101. Charles J. WINGERT PS1 & PS3

IMPROVEMENTS TO THE ORGANIZATION AND CURATORIAL PRACTICES OF THE ALGAL RESOURCES COLLECTION

102. Ariel ZAVALA PS2 & PS3

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103. Paul V. ZIMBA PS1 & PS3

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LIST OF EXHIBITORS

Turner Designs — Booth 1

Contact: Tom Brumett
Phone: 877-316-8049
Email: sales@turnerdesigns.com
Website: www.turnerdesigns.com

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Phytoxigene, Inc. — Booth 2

Contact: Mark Van Asten & Greg Ford
Phone: 269-983-3654
Email: Info@phycotech.com
Website: www.Phycotech.com

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Phytoxigene products are simple molecular assays for the detection of genes responsible for the production of microcystin, nodularin, cylindrospermopsin and saxitoxin in fresh, brackish and marine water environments. The Phytoxigene CyanoDTec is a multiplex quantitative PCR assay for detecting and quantifying toxin producing cyanobacteria and the DinoDTec assay, will detect the presence of Saxitoxin producing Dinoflagellates.

Fluid Imaging Technologies — Booth 3

Contact: Harry Nelson, VP of Aquatic Markets
Address: 200 Enterprise Drive
Scarborough, ME 04074
Phone: 207-289-3200
Email: info@fluidimaging.com
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PP Systems/bbe Moldaenke — Booth 4

Contact: Tim Doyle, Director of Sales
Address: 110 Haverhill Road Suite 301
Amesbury, MA 01913
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Email: Sales@ppsystems.com
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Eurofins Abraxis, Inc. — Booth 5

Contact: Lori Fields
Address: 124 Railroad Drive
Warminster, PA 18974
Phone 215-357-3911
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Website: www.abraxiskits.com

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Beta Analytic, Inc. — Booth 6

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Email: lab@radiocarbon.com
Website: www.radiocarbon.com

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McLane Research Laboratories, Inc. — Booth 7

Contact: Ivory Engstrom
Phone 508-495-4000
Email: mclane@mclanelabs.com
Website: www.mclanelabs.com

McLane Research Laboratories manufactures time-series oceanographic profilers, samplers, and flotation. Committed to supporting scientific needs from proposal planning to deployment and recovery. Our advanced in situ instrumentation includes samplers that detect, identify, or collect phytoplankton; the Imaging FlowCytobot (IFCB), the Environmental Sample Processor (ESP), and the Phytoplankton Sampler (PPS).

Cambridge Isotope Laboratories, Inc. — Booth 8

Contact: Ben Priest
Phone 978-749-8000
Email: bpriest@isotope.com
Website: www.Isotope.com

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YSI, a Xylem Brand — Booth 9

Contact: Lisa Landry
Phone 225-436-0446
Email: Lisa.Landry@xyleminc.com
Website: YSI.com

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LOCAL INFORMATION

Restaurants
Fishers at Orange Beach Marina
fishersobm.com

Fin and Fork
www.finandfork.com

Cosmos
www.cosmosrestaurantandbar.com

Cottons
cottons1985.com

Playa at Sportsmans Marina
playaoba.com

Cobalt
cobaltrestaurant.net

The Gulf
www.thegulf.com

LuLu's
lulubuffett.com/gulf-shores/

Golf Course
Cotton Creek at The Craft Farms Resort
www.craftfarms.com/cotton-creek-course

For More Visitor info:
www.gulfshores.com

Entertainment
Dolphin and Whale watching tours
dolphincruises.net

The Wharf Entertainment District
alwharf.com

Perdido Key State Park
www.floridastateparks.org/parks-and-trails/perdido-key-state-park

Hummingbird Zipline Course
zipthegulf.com

Gulf State Park
www.alapark.com/parks/gulf-state-park

Alabama Gulf Coast Zoo
www.alabamagulfcoastzoo.com

OWA Entertainment Destination
visitowa.com

National Naval Aviation Museum
www.navalaviationmuseum.org

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www.fort-morgan.org


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We wish everyone safe travels home and look forward to seeing y'all at US HAB #11!

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Microcystis bloom in farm pond, Auburn Alabama.
Photo Credit: Alan WIlson